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Third Semi-Annual Meeting of the American Gas-Light Association,

AT WASHINGTON, D. C., MAY 12, 1875.

[Continued from page 24.]

THURSDAY, MAY 13, 1875.

The meeting was called to order by the president.

The application by George K. Reed, treasurer of the Lancaster Gas-Light Co., for active membership was presented, and he was duly elected an active member, and introduced to the association by the president.

REMARKS ON THE DECEASE OF GEO. W. PARSONS.

Mr. Henry Cartwright, of Philadelphia, made the following remarks:

Mr. President and gentlemen: It is with mingled feelings of profound regret and personal sorrow that I rise to announce to the Association, before its adjournment, the heavy loss we have sustained in the decease of Mr. Geo. W. Parsons, late Superintendent of the Rochester Gas-Light Company. As one of the originators of this Association, he was impressed with the importance to the profession of such generous interchange of ideas and experiences as would lead to best results; as a member he became an active spirit in all its working details, and labored cheerfully amongst us to carry them out.

The sad duty of announcing to you his decease, since our last meeting, is the more affecting to me from the fact of my having had the pleasure of introducing him in the profession, as Superintendent of the Rochester Gas Works, on their completion in 1848. To this position he earnestly applied himself, and by his judgment and skill, as exercised for over a quarter of a century, his works have become a point of reference for everything showing a superior degree of good management, intelligent direction, with a faithful administration of the affairs of his company, through a period of success, as also of varied trials and issues, with the community in which he lived; and no man amongst them was more worthy, or has received more respect, or more valued testimonials of esteem, than our departed associate. His charming qualities of head and heart were a noble example, and are deeply engraven in my memory, and his unflinching honesty of purpose, and untiring industry to promote every good object he engaged in, were prominent points in his character and understood by all who knew him.

His life was full and complete, and now that he rests from his labors, may he well have earned the welcome reward of "well done, thou good and faithful servant."

As an expression of the esteem in which Mr. Parsons was held by this Association, I beg to offer the following preamble and resolution, and ask that it may appear on our record.

Whereas, It has pleased our Heavenly Father since the last meeting of the Association, to remove from the labors of Earth to the rest of Heaven, one of our most valued members, Mr. Geo. W. Parsons, late Superintendent of the Rochester Gas-Light Company, who died respected by all and beloved by thousands—

Therefore—*Resolved*, That this Association hereby express its high appreciation of the personal character and superior professional attainments of our deceased associate, and that we commend to every member of the organization the noble example of our lamented friend.

REMARKS OF H. H. FISH, OF UTICA.

Mr. President—I rise at the request of those about me to second the resolution. Under the circumstances I cannot hope to add anything to what has been said, and so well said by the mover of the resolution. But I desire to endorse, as I do with all my heart, everything that has been so feelingly expressed, of the character and virtues of our departed friend. It was my good fortune, Sir, to make the acquaintance of Mr. Parsons early in my connection with the business and pursuits which have brought this Association together; and during an unbroken friendship of almost a quarter of a century, I have ever found him the intelligent conscientious adviser, the firm and public spirited citizen, the faithful public servant, the warm-hearted and genial friend; and in all his relations illustrating to an eminent degree, the solid virtues of an honest man and the lovely graces of a Christian gentleman.

Charged as we are, with duties connected with our respective companies, and the general public, which bring us into daily contact with aspects of human nature, not altogether lovely to contemplate; we have doubtless felt at times how difficult it was, with the best intentions, to escape uncharitable criticisms. It were well therefore, Mr. President, for us, if when the cares and duties of this life with each of us are ended, we can leave to our friends and families, an example as pure, and a memory as fragrant as that of our departed friend, George W. Parsons.

After which the preamble and resolution were unanimously adopted, and the association adjourned *sine die*.

Mr. Editor:

Thus ended the wise doings of that gathering of gas men who had come from the four corners of this Yankee nation, and from the "Hub," to tell each other what they knew about gas, both in its natural and artificial phases. The evidences of their wisdom were many and of great weight; one worthy member *Forestall*-ed any doubts of his genius by producing "solid chunks" thereof, and quite a *Breeze* was raised by the pouring of tar upon the somewhat heated debate. *Price*-less as this evidence was that the association was of strong and well an-*Neal*-ed material, all heard the president's gavel declare the deliberations at an end, with a feeling that it would be well to leave the remnants of that feast of wisdom for the next meeting—and doubtless of such fragments there are many basketsful. I am free to admit, Mr. Editor, that the leaven of vagabondage lying within the secret springs of my nature, jumped up and made a glad noise at the release, for I had realized in that morning session how weary and how useless our work at times appears. I had been studying the beauties of that glorious morning before entering the gathering, and reached my seat among my fellow members only to hear those memorial words of honest respect and kindly human friendship to Mr. Parsons, than whom no truer-hearted, careful, progressive engineer has served his work-day life among us—it was a fitting close to our work. I realized the lesson of his life, the value of his earnest, straightforward character, and mourned the loss from among my friends of so much that was kindly and true. We do so need his class of men among us, that as each one of them drops out of his place in life, we see the ranks close up about us; but alas, we know they are by so much the thinner.

The City Gas Company had made itself responsible for the entertainment of the members, and right royally did it fulfill the duties of host. Under the guidance of the genial engineer, McIlhenny, the members were driven in large stages to the gas works and given an opportunity to inspect, mark, and inwardly digest that establishment; the genius of Mac, like his smile, was that day radiant and omnipresent; it shone in his useful patent and clever device for coaxing the dull coal to give its best results and to safely garner them when once given up. I turned my face to the wall and dropped an envious tear and tried to possess my soul in grumbling, but that smile, that gentle smile, with which Mac calmly, complacently, but industriously piloted us around, forbade envy or ill humor—verily, it was as cheering as that pink and spicy drink the deft bar-man made us ere we left the hotel—so all-pervading was its geniality. From the works we were conveyed by stage to the river side, meanwhile did *Breeze* gently blow upon us the beauties of tar-fires and excessive purification. At Seventh street wharf we found the gallant steamer "Pilot Boy" awaiting our arrival. I never could tell why gallantry was always presupposed to be inherent in naval architecture any more than courtesy or philanthropy, but "custom sanctions its use," as Lindley Murray's grammar puts it, so down it goes. Here also we found the ladies of the association who had kindly consented to grace the expedition by their presence. The usual amount of snorting whistles, the average earl splitting jangle and clamor of bells, the inevitable leap of the last man, and the "Pilot Boy" is under way, bound to Mount Vernon, one of the most charm-

ing excursions it is possible to take from Washington. Nature seemed to have entered into an arrangement with Mac to wear her loveliest aspect that day, to aid his Company's hospitality and rival his smile, for never did country look more fresh or river seem so sparkling, or air so balmy as on that May day. Then, too, those high banked hills were written in letters of blood upon our history, and Long Bridge seemed again swarming with the pomp and circumstance of war; but all this is visible only to the mind's eye, for time and nature have spread the green mantle of charity over the battle rents and scars of those sad days, and the ploughshare turns the sod erewhile torn by angry shot and shell. Mount Vernon duly reached, the party climb the gravelly path to join with those who oft have gone before to pay their homage at the holy shrine. I wonder why they took gas men to Mount Vernon? It has been a mystery to me since that day—theoretically there is nothing more ennobling than the contemplation of the foot-prints left upon the sands of time by those who have made their lives sublime: yet, I am free to say, conversely, that in point of lowering the mercury in the bulb of one's self-esteem, that pleasing occupation may be backed against any other form of mental misery known. Perhaps the visit was a sort of penitential pilgrimage, or an improving mortification of the flesh; whatever its intents it evidently failed, for as I mentally prostrated myself before the ashes of so much that was manly and great, I overheard one out-wester say, "Poor George, what did he know of Breese's methods of destroying residuals." "What, indeed!" replied a fellow pilgrim at the tomb, "and think too, that he never shall know what Detroit cobble stones purify to the bushel." Horrified I turned to my charming *pilgrimess* only to find her sinking the sentiment of the hour in the base levity of accepting the fortifying aid of a homely but tender sandwich; sadly but firmly I led her onward and upward, and had just succeeded in getting the better feeling awakened in her, and her heart beating responsive to the music of the past, when some dull clod of a gas man said we could buy lunch near by. Alas, the past and future have no place in the active present, and leaving the dead past to provide funeral obsequies for its own dear departed, and trusting no beguiling future, we sat down to a frugal meal in George's summer kitchen, where, waited upon by good appetites, and the only original descendants of George's slaves, I swallowed my sentiment and milk at a gulp. Beguiling my fair companion to enter the mansion, I had but just grown poetical and sentimental over some old boots and saddle-traps, and had begun to compare the pure sweet memories of George's life-time to the slimy pools of political life of our day, when a hideous Italian band burst into wild discord with the "Mulligan Guards." Whatever the music of the future is to be I pray Wagner may eliminate from it any possibilities of the performance of popular airs; a system of music so severely classical as to give every street boy the lock jaw who tries to whistle it, disrupt the daring hand organ that tried to grind it to powder, or burst the strings of decrepit Italian harps, would be, as the lamented A. Ward observed, a sweet boon. So it was throughout from cellar to ice house, from ice-house to conservatory, and all over the plantation, sentiment was pushed to the wall and the obtrusive, money-making present ever surrounded us; still, like the colored troops, the gas men "fought" nobly to be correct; they tried to appreciate Mount Vernon—aside from its historic and romantic claims upon them they recognized its great natural beauty of situation, its commanding and charming vistas, and the magnificence of the grand river encircling its base—even the most prosaic had some tribute to pay to all these features, and had not a shrewd suspicion gone out that on board the "Pilot Boy" lunch lay in waiting and inviting attack, I doubt not but some of us might still be there, paying city prices for country flowers, or searching for "George's cherry tree" and "little hatchet." Afloat again we look back for a moment at the receding shore, whose tree tops wave a graceful adieu, and then Mac invites us to a lunch.

Appetizing as the trip has been here is enough for all, daintily spread, while firewater lends its seductive influence to the board. Somebody captured that terrible Italian band, and so like any other monarchs we lunch to music (?). But still we are not a lively party, either we are hungry, or tired, or both, for a strange gravity is stealing over us. Walker still seeking to learn of the numerical order of the commandments, here offers to sing a psalm-tune, and has risen to lead the air, when the sudden, unexpected "pop" of a champagne cork came like the wave of an enchanted wand to make a transformation scene: Walker smiled like a happy maid over her lover's first kiss, as he saw the irrepressible Captain White pouring "the sparkler" out, and his smile widened out like a ripple on the placid waters of a pond round a diving frog, until it had touched the face of the outermost man among us, and from that moment "nor lack of mirth nor want of joyous sound" disturbed the harmony of the trip. Song and story floated around—McIlhenny was toasted and his company tenderly handled in short speeches, and all went merry as a *married belle*. At this time occurred the feature of the trip. The average gas man is nothing if not argumentative; his best thoughts flow in the heat of debate, or sparkle in his paper on—let us say purification—so it was not surprising that even in this festive hour he should be true to his nature. The debatable point was as to the relative strength and lasting power of clay and iron retorts. The iron retorts found a weighty champion in our friend of "The Oregon," while the strength and weaknesses of our common clay were exemplified by our especial charmer from Staten Island. The debate was warm, very warm; the gentlemen used good language, but excessive gesticulation; cravats and collars were discarded and coats were entrusted to the care of admiring listeners, and the discussion only reached an end by the sudden "burning out" of the iron retort. General rejoicing and singing took place, and the national anthem—"Mac is a jolly good fellow, which nobody dare deny," was chanted to cheer the victor. Here let me indite a moral fact, apparently ignored at Cleveland, that champagne is about as important an element in gatherings of gas men as school books tell us the camel is to the hospitable but kleptomaniac Arab, from which versatile beast that fortunate Bedouin obtains milk, flour, fuel, linen dusters, palm-leaf fans and fibres wherewith to make ropes and camel's-hair-shawls for his sweetheart—or stay, am I mixed, is it the date tree which furnishes them those things? on sober second thought I am afraid it is the date; the camel's strong point being the division of his stomach into water-tight compartments, hence the beast cannot be of interest to the gas-man who only uses water in "seals," and is now trying to do without it even there.

Safely back at Washington, and the perilous ascent of the gang-plank made, the kindly stage once more takes us to its bosom and lands us safely at Willards. Before leaving the steamer, Mr. McIlhenny, in behalf of his company, invited the Association to a banquet in the evening, thus piling as it were, the Capitol upon the Treasury Building, in this matter of hospitality; but, as Tennyson asks, "was there a man dismayed?" I will answer truly and fearlessly, not a single dismay, but quietly going our separate ways, each man pledged himself and sharpest appetite to that feast.

The dinner was served promptly at 6 P. M., in the ladies' dining hall of Willard's Hotel. Over one hundred and twenty five members of the Association, and other guests of the Gas Company, among whom were several prominent Washington scientists, sat at the board. Mr. Price, acting President of the Association, presided at the head of the double table, Mr. McIlhenny and Captain White taking charge of the two lower ends. The tables were neatly decorated, and the dinner was in full keeping with the liberal hospitality and good taste which had marked the entire day's entertainment, and was a credit to those to whose care its details were entrusted. The occasion was thoroughly enjoyed by all, and when the solids were duly disposed of, and the liquids introduced, many of us felt as did that colored preacher, who in exemplifying in his own experience the difficulty of withstanding temptation, stated to his hearers that he was once given an opportunity to steal unseen a pair of *fine large boots*, but so overcame the tempter as to compromise on an equally attractive pair of *low shoes*, and so those of us who were strongly tempted by, yet feared the *large bottle*, caved in morally and *compromised on the pint*, and dull care melted away in the smoke of the fragrant Havana. The intellectual portion of the banquet was opened by Mr. Price, who replied to a toast to the Association, and expressed in kindly phrase the gratification all felt at their hospitable reception and entertainment by the City Gas Company—in closing he proposed the health of the Washington Gas-Light Company, to which toast Mr. McIlhenny responded in a few well chosen sentences, welcoming the guests, and congratulating them upon the success attending their semi-annual meeting, and modestly accepted the kind words of his fellow members for his Company.

A toast to the New England Association was then called, and was wittily replied to by Mr. Geo. B. Neal, Secretary of that body, who sketched its rise and success, and gave pleasing reminiscences of the early gas troubles in the East. Prof. Hedrick, of Washington, replied to a toast to—"the improvement in the science and apparatus of gas manufacture," a theme which his long experience and special study enabled him to treat admirably. Prof. Henry, of the Smithsonian Institute, replied to a toast to—"The Sister Sciences," giving in his remarks a most interesting and graphic survey of the field of scientific labor and research, with which his life has become identified. He further made such flattering remarks to the gentlemen of the Association that my modest pencil blushes to recall. The remaining regular toasts of the evening were—"To Woman," and "The Press."—I regret that the name of the gentlemen who so humorously replied for the press has escaped my memory, he and his pleasant remarks deserve a kindlier fate than my treacherous memory has awarded.

Captain White astonished his hearers by replying to the toast to Woman with an eloquence and fervor worthy of the ideal woman he sketched for the admiration of his fellows. From this point the banquet lost formality and the conversation became general, song and story at a late hour closing an entertainment than which nothing could have been better planned or more fully appreciated.

A VERY BAD'UN.

The following members of the association were present at the meeting on the 12th and 13th of May, 1875:

H. P. Allen, New York city.
Charles L. Allmand, Norfolk, Va.
John Balmore, Harlem, N. Y.
William H. Baxter, Petersburg, Va.
William R. Beal, Moot Haven, N. Y.
Joseph W. Beatley, Brooklyn, N. Y.
W. W. Beggs, San Francisco, Cal.
W. H. Bradley, Brooklyn, N. Y.
E. M. Breese, Detroit, Mich.
Joseph Bringhurst, Wilmington, Del.
P. T. Burtis, Chicago, Ill.
Henry Cartwright, Bridgeport, Conn.
Matthew Cartwright, Rochester, N. Y.
William Cartwright, Oswego, N. Y.
John S. Chambers, Trenton, N. J.
N. B. Cranshaw, Millville, N. J.
O. E. Cushing, Lowell, Mass.
W. H. Denniston, Pittsburgh, Pa.
William Dunbar, New Albany, N. Y.
George Dwight, Springfield, Mass.
H. H. Edgerton, Fort Wayne, Ind.
H. H. Fish, Utica, N. Y.
Theobald Forstall, New Orleans, La.
E. S. Funnell, Albany, N. Y.
C. A. Gerdenier, Bridgeport Conn.
William Gardner, Pittsburgh, Pa.
T. W. Gates, Hamilton, Canada.
L. P. Gerould, Newton, Mass.
W. W. Goodwin, Sacramento, Cal.
A. G. Guerard, Savannah, Ga.
L. C. Hanford, Norwalk, Conn.
John P. Harbison, Hartford, Conn.
R. R. Harriman, Lawrence, Mass.
William Helme, Atlanta, Ga.
A. Hickenlooper, Cincinnati, Ohio.

George S. Hookey, Augusta, Ga.
Thomas C. Hopper, Beloit, Wis.
C. W. Isbell, New York City.
S. Lewis, Detroit, Mich.
T. Littlehales, Hamilton, Canada.
L. G. McCauley, West Chester, Pa.
John H. McElroy, Pittsburgh, Pa.
John McIlhenny, Columbus, Ga.
Oliver McIlhenny, Montgomery, Ala.
George A. McIlhenny, Washington, D. C.
Hugh McLean, Macon, Ga.
P. Munzinger, Doyleston, Pa.
C. Nash, Williamsport, Pa.
George B. Neal, Charlestown, Mass.
Charles Nettleton, East Chester, N. Y.
F. H. Odiorne, Boston, Mass.
J. D. Patton, Treverton, Pa.
A. D. Perry, Portsmouth, Va.
T. J. Pishon, Roxbury, Mass.
W. H. Price, Cleveland, Ohio.
S. Prichitt, Nashville, Tenn.
Benjamin Rankin, Louisville, Ky.
G. K. Reed, Lancaster, Pa.
George Richardson, Wilmington, Del.
T. F. Rowland, Green Point, N. Y.
J. R. Scott, Waltham, Mass.
F. C. Sherman, Worcester, Mass.
A. B. Slater, Providence, R. I.
Marcus Smith, Willkesbarre, Pa.
I. N. Stanley, Brooklyn, N. Y.
G. T. Sutton, Peekskill, N. Y.
Samuel Trumbore, Easton, Pa.
Thomas Turner, Charleston, S. C.
James H. Walker, Milwaukee, Wis.
W. H. White, Brooklyn, N. Y.
R. M. Wilder, Coldwater, Mich.
A. C. Wood, Syracuse, N. Y.

Chemical Repertory.

No. 137.—August 2, 1875.
EDITOR—HENRY WURTZ.

CHEMICAL EXCERPTS.

1462. Washing Woolens.—Prof. Artus, who has devoted himself to the discovery of the reason why woolen clothing, when washed with soap and water, will insist upon shrinking and becoming thick, and acquiring that peculiar odor and feeling which so annoys housekeepers, says these evil effects are due to the decomposition of soap by the acids present in perspiration and other waste of the skin which the clothing absorbs. The fat of the soap is then precipitated upon the wool. These effects may be prevented by steeping the articles in a warm solution of washing soda for several hours, then adding some warm water and a few drops of ammonia. The woolens are then to be washed out, and rinsed in luke warm water.—*Scientific Press.*

1463. A Sulphur Region.—The Winnemucca (Nevada) *Silveo State* says: "Right here in Humboldt, within a hundred yards of the Central Pacific railroad, and in the immediate vicinity of the silver mines of the Humboldt range, are beds of sulphur, capable, it is believed, of supplying the whole world with that article for centuries. These sulphur deposits are located in the Humboldt valley, not much over a mile from the Humboldt House, and probably thrice that distance from the base of the Humboldt range. But little is known in reality of the extent of the beds, except that they cover a large area in the valley, and have been prospected in one place to a depth of several feet, where the excavations expose hundreds of tons of the pure article, which can be made available for commercial purposes at no greater expense than loading it on the cars and shipping it to the great commercial centres."

1464. A Medical Strike.—A strike among professional men is certainly a novelty; and it has been reserved for Switzerland to produce the same for the astonishment of mankind. In the canton of Glarus, out of 23 licensed physicians, 21 declare that they will perform no more official duties until an efficient sanitary police be established, and medical examinations be conducted by a committee of competent men. What a harvest must open before the dazzled gaze of the two disaffected individuals! We can imagine the doctors striking against the quacks; but for them to strike in favor of a sanitary police, in favor of a means for preventing the diseases by curing which they make their bread and butter, certainly passes the bounds of reasonable belief. If the doctors of New York should follow the example of these Swiss brethren for the last mentioned reason, what a vast relief to our stench-sickened citizens would be produced.—*Scientific American.*

1465. Action of Atmospheric Vapor on the Luminous and Obscure Heat of Solar Rays.—Father Provenzali, as the result of investigations on the above subject, finds that the luminous heat and the obscure heat do not maintain a constant relation, but that, while the former diminishes, the latter increases, and *vice versa*. The luminous heat diminishes in proportion as the quantity of vapor in the atmosphere augments. Such is not the case with obscure heat; for during days of the greatest absolute humidity, the obscure rays are almost always the strongest. This is ascribed to the radiating power of the aqueous vapor, which, after having absorbed the luminous rays, emits them under the form of obscure heat. The conclusion reached is that photometric observations, continued over a long period, may be a useful means of determining the hygrometric state of the superior regions of the atmosphere.—*Ibid.*

1466. Mud Spots on Varnish.—On this subject the *Carriage Monthly* remarks: High grade finishing varnishes, whether of English or American makes, possess their wearing qualities from the simple fact that they retain their elasticity or oily principle to a great length of time. The surface hardens sufficiently to resist dust and to admit of being washed, but the body of the varnish remains soft and sensitive, and mud allowed to dry on the surface of the varnish both stains it and extracts by capillary attraction the oil contained in the varnish. Each spot of mud, according to its size and shape, acts on the varnish immediately under it, but no further, from the fact that a suction is created by the evaporation of the moisture contained in the mud. Different kinds of soil act with more or less injurious effects. Sandy soil would have but a slight effect on a varnish which would be badly stained by more adhesive clayey soil, and the filth of a large city would be still more fatal to the gloss of the varnish.

1467. Nitrous Acid in Plants.—Schonbein first detected nitrous acid in the juices of different plants, by the common reagent for that acid, a solution of potassium iodide, starch, and sulphuric acid, which gives to the liquid containing nitrous acid a fine blue color. Subsequently, however, he was led to attribute this bluing to the presence of active oxygen and no longer to nitrous acid. In order to determine whether or not Schonbein's second conclusion was a correct one, a series of experiments has been made at the laboratory of the Illinois Industrial University, a paper on which M. P. Genadius contributes to the *American Chemist*. The conclusion drawn from these tests is that very strong evidence is offered of the presence of nitrous acid in plants; for the formation of nitric acid would be preceded necessarily by that of nitrous, the latter being, as it were, a stepping stone to the former. So that the bluing, which the experiments obtained from the juices of the different plants, is probably caused in large measure by the nitrous acid present in those juices, with which, as soon as the oxygen of the air comes in contact, and the chemical changes (fermentation and decomposition) begin, this acid is either destroyed or changes into nitric.—*Exchange.*

1468. The Earth's Distance from the Sun.—G. B. Airy, the Astronomer Royal, has received from the French observers of the transit of Venus, the first results of their calculation of the angle of parallax, making it 8,879 seconds. This corresponds to a solar distance of 92,100,000 miles in round numbers. No particular dependence can be placed on this result (which is also carried only to three decimal places); the object of so many posts of observation of the transit being to select the best corresponding of independent observations, the variance of which it is hoped, will be on this occasion very slight. The calculations of Encke, based on the transit of 1569, made the earth's solar distance 95,360,000 miles, the parallactic angle being 8,577,116 seconds. That was the accepted distance in the text books of fifteen years ago. Astronomers got to be dissatisfied with it, and with the help of later observations cut it down to 92,000,000, against which there has been within the last two years some rebellion as yet too high a figure. One of the immediate effects that a discovered inaccuracy of a million miles or so would have upon the general public would be some little upsetting of other solar distances in this particular planetary system with trifling alterations among the distances of the fixed stars.—*N. Y. World.*

1469. Extinguishing Fires in Ships' Holds.—Brimstone has been suggested as a convenient material for extinguishing fire in enclosed chambers. It is remarked that 60 lbs. of brimstone would render 3,500 cubic feet of air incapable of supporting combustion. In a closed place, like a ship's hold, the sulphurous gas produced by the burning of the brimstone would penetrate where water from the decks could not be brought to bear, and the density of the gas would prevent its rising or spreading if care were taken to close the hatches with wet sails, etc. It is suggested in *Les Mondes* that the brimstone should be made up in the form of large matches, the ends of which could be passed through scuttles prepared for them in the decks or bulkheads in case of need. It is asserted that 20s. worth of brimstone would be sufficient to stifle and annihilate all traces of combustion in an air space of 35,000 cubic feet. In connection with the above, we may remark that chloroform vapor has been lately found by a chemist in Antwerp to act with great rapfdity in extinguishing the flame of the vapor of petroleum. Combustible gases mixed with chloroform vapor immediately lost their explosive properties, and even their combustibility. It is suggested that chloroform might be advantageously employed upon a large scale for extinguishing fires in petroleum stores and on board ship.

Metropolitan Gas Monopoly.

[Under the above heading appears, in a recent London *Mining Journal*, a communication under the above heading, which appears to contain figures and information justifying its transfer.—Ed.]

Sir; The letters on this question, which appeared in the *Times* of May 22, from Mr. Eyken, a director of the Chartered Gas Company, and the secretary of the Imperial Gas Company, the two largest companies in the metropolis, seem to require some notice. Mr. Eyken says that his company is under such supervision and control as to secure the requisite purity and illuminating power of the gas that commissioners fix its price, and that an auditor certifies the accounts. Under these guarantees Mr. Eyken seem to consider that the system works well, and the public ought to be satisfied; but he says nothing of the system itself under which these arrangements are carried out, and it is this which affects the public, and which they have strong reasons to find fault with.

The present mode of connecting capital and dividend is wrong in principle, and has added considerably to the price of gas. Under this system one company can charge 5s. per 1000 cubic feet, whilst another is satisfactorily remunerated by charging 3s. 4d., although both draw their supply of coal from the same district: the same market for labor and materials is open to both, they have to distribute the gas over similar areas, and there should consequently be little if any variation in the proportionate expense. The result of this system is that the company, having by virtue of its monopoly the power of charging a price

that may be necessary to bring up the dividends to the fixed amount, has no inducement to limit capital, but, on the contrary, is encouraged to increase it extravagantly.

The published accounts of the gas companies do not supply all the figures necessary to enable me to state the relative proportion of expenditure to consumption of gas, but it varies from about £4 10s. to £8 per ton of coal consumed annually. There is no sufficient reason for this great difference except extravagant expenditure or improper treatment of capital. Speaking generally, works can be constructed at the same cost by all the companies; the outlay in mains will be greater in some districts than in others, but it is impossible it should be so much greater as to account for the difference above mentioned. Taking £4 10s. as the capital expended per ton of coal used for small works, £4 may be taken as the proper expenditure for the supply of the whole metropolis.

The capital of all the companies may be taken in round numbers at £10,000,000. The quantity of coal used in 1873 was 4,430,000 tons; therefore, if £4 be taken as the proper rate per ton of coals, the capital should be £5,720,000, or (say) in round numbers £6,000,000, showing a needless outlay of £4,000,000. That I am not understating the necessary expenditure is shown by the fact that since 1863 the smaller companies have supplied the increased consumption by an expenditure of £3 10s. per ton, but during the same time the larger companies have expended $8 per ton, hence the high price of gas. The obvious remedy will be apparent if we compare the case of a gas company conducted as our metropolitan companies now are, with the case of a supply which might be provided by a municipal authority.

Take the case of a company; it would start with a capital of (say) £100,000, and the consumers would be charged such a price for their gas as would produce an income of £10 per cent. Year by year the shareholders would divide these earnings; there would be no reserve made for the renewal of plant, which would be worn out and wholly exhausted in (say) 34 years. The company would then come to an end so far as the original capital of £100,000 was concerned. If it were to continue the supply, fresh capital would need to be raised for the purpose, for the first £100,000 would have disappeared. A second capital would be raised, and if dividends had to be provided for both the old capital and the new, obviously the price of gas must be raised. The existing companies have not, as a matter of fact, allowed the whole of their original capital to disappear in this way, but they must have added to their 10 per cent. dividends between 2 and 3 per cent. for renewals, making the total charge from 12 to 13 per cent.

Compare this state of things with what would have happened if the supply of gas had been provided under wise municipal arrangements. A corporation would easily have raised £100,000 at 4 per cent. The charge on capital at the same rate as that charged by the gas company would be £10,000, of which £4,000 would be absorbed by interest for the first year, but reduced as the capital was paid off, leaving a balance of £6,000 a year to go in liquidation of the debt. In seventeen years the whole debt and interest would be paid, and the corporation would have the works and property wholly free from debt. A few figures will show the actual results:

A gas company's charges on a capital of £100,000, at 10 per cent., will in 34 years amount to	£340,000
The renewal of capital will amount to	100,000
Total	£440,000
A public body would have to pay for interest on a capital of £100,000, which is being reduced annually by liquidation	35,000
The liquidation of capital will amount to	100,000
Total	£135,360
Taking the average charges made by a gas company at 8 per cent. for dividends and interest on money borrowed and renewed, the charges will be	£372,000

This illustration points to the obvious remedy for the mischief that has grown out of a vicious system. The management of the gas supply should be put into the hands of a commissioner, as suggested indirectly by the Board of Trade. We should then no longer have to pay on too large an expenditure of capital, or the absurd cost of distribtuion, caused by mains belonging to different companies being carried under the same highway, leakage would be lessened, and the price of gas reduced. The companies have the right to be fairly treated, as, however extravagant their investments may have been, they have been made with the sanction of the community as represented by Parliament. *C. G. Cleminshaw.

Westminster Chambers, June 7.

Application of Illuminating Gas to the Pyrophone.

In a recent communication to the *Comptes Rendus* of the Academy of Sciences, M. F. Kastner gives details of his method of applying illuminating gas in place of pure hydrogen in working the new musical instrument, the pyrophone, of which he is the inventor. He states that, having made a number of experiments upon the properties of singing flames produced by the combustion of hydrogen gas, he has ascertained that if, in a tube of glass or other suitable material, two or more isolated flames of proper size be introduced, and placed at a point corresponding to one-third of the length of the tube, reckoning from the base, such flames will vibrate in unison. This phenomenon continues as long as the flames remain separated, but the sound ceases as soon as they are brought into contact.

As a practical application of this principle, M. Kastner has constructed the musical instrument above referred to, which bears some resemblance to an organ, though differing from it in this respect, that, instead of being operated by atmospheric air blown in, the notes are produced by the singing of flames within the pipes, upon the dimensions of which the quality of the sound, its pitch, and intensity, of course, depend.

It is well known that when a jet of pure hydrogen gas is burned in a tube of glass, china or other vibrating material, a soft pleasant tone is produced, but it is the employment of this particular gas in connexion with the pyrophone that has hitherto been the chief obstacle to the generally satisfactory working of that instrument. In practice, the use of hydrogen gas is undoubtedly attended with certain inconveniences. In the first place, it is difficult to prepare; next it necessitates the employment of large gasholders for its storage; lastly, it is dangerous. Having these facts in view, M. Kastner decided on abandoning the use of pure hydrogen, and instituted a series of experiments with the object of ascertaining whether ordinary lighting gas, which is at all times easily procurable, would not be equally applicable for his purpose.

In the course of his experiments he found that no sound could be obtained from the combustion in a glass tube of two separate flames of ordinary gas, and this he attributed to the presence of carbon in the flames. He also ascertained that although a perfectly clear sound was obtainable from the combustion of pure hydrogen gas—that is, without the interposition of any solid body in the flames—it was impossible to make the tube vibrate when ordinary lighting gas was employed, even though the flames burned under precisely the same conditions. He came to the conclusion, therefore, that it would be necessary, by some process or other, to eliminate the carbon from the gas, and this result he achieved in the following manner.

On examining the combustion of ordinary lighting gas in a tube of glass, metal, or other suitable material, it is found to produce a flame which is either luminous or resonant. When the flame is simply luminous—that is, when the air in the tube does not vibrate—it takes an elongated shape, pointed at the top, but broad towards the centre, and burns with so little rigidity that the slightest current of air suffices to make it unsteady. On the other hand, when the flame is resonant—that is, when it causes in the tubes the vibrations necessary to the production of sound—its form is contracted at the centre, but spread out at the top. As long as the air in the tube vibrates, the flame burns with great rigidity, throwing off its carbon, so to speak, by a self-contained mechanical power.

In point of fact, resonant flames produced by the combustion of ordinary illuminating gas are surrounded by a photosphere which does not exist when the flame is simply luminous. In the latter case the carbon burns in the flame, contributing a large proportion of its light-giving power. But, in the case of resonant flames, the photosphere by which each single flame is surrounded, contains an explosive combination of oxygen and hydrogen, which determines the vibrations of air in the tube.

In order that the sound may be produced in all its intensity, it is necessary that the *ensemble* of the detonations produced by the molecules of oxygen and hydrogen in a given time should agree with the number of vibrations corresponding to the sound produced by the tube. To effect this it occurred to M. Kastner to increase the number of his flames, and by thus augmenting the number of detonations produced by the oxyhydric mixture in the photospheres, determine the amount of vibration of air in the tube. Instead, therefore, of employing only two flames of pure hydrogen, he arranged four, six, and even more jets of ordinary lighting gas in the same tube. He noticed also that the greater the height of the flame, the more carbon it contained; but this he was enabled to rectify by making his flames smaller, at the same time increasing their number, so as to obtain a total surface of divers photospheres sufficiently large for the production of vibrations. The amount of carbon contained in all the small flames together would always be much less than that which would be found in two large flames necessary for producing a similar sound. As long as the flames were kept apart, sounds were produced whose *timbre* was as clear as those resulting from the combustion of the pure hydrogen; but the moment the flames, or rather the photospheres corresponding to the flames, were brought into contact, the sound immediately ceased.

When the flames are resonant, the carbon contained in ordinary illuminating gas is almost entirely eliminated; in fact, a very sensible deposit of it takes place upon the interior surface of the tube, at a corresponding to the height of the flames and below it, and this deposit increases as long as the air in the tube continues to vibrate. The pyrophone may now, therefore, be said to act equally as well with ordinary gas as with pure hydrogen.

The phenomenon of interference is produced under exactly similar conditions for both gases, the flames always occupying the same position in the tube—viz., at a third of the distance from the base. In his paper, however, M. Kastner describes a new process for stopping the sound. Supposing that one or more flames, placed in a tube at the point above indicated, determine the vibration of the air in the tube, if a hole be pierced at that particular spot the sound will immediately cease. Applying this principle, a musical instrument might be constructed which would be a species of flute acting with singing flames. Such an instrument would, however, from a musical point of view, be very imperfect, inasmuch as the sound would not be so effectually stopped as when recourse is had to the phenomenon of interference. If, instead of making an opening in the tube at the distance of a third from the bottom, one were made at the distance of a sixth, the sound would continue, but the note produced would not be the same, but its sharp.

In all these experiments the formation of ozone was easily perceptible as soon as the flames caused the air in the tube to vibrate; but the presence of this body may be ascertained by any of the well-known chemica reagents.

Puddling with Natural Gas.

A few weeks since, a correspondent furnished our readers with a few points relative to a very interesting process of iron refinement which attracted his attention during a hasty visit to Pittsburg. The following extract from the *American Manufacturer* of that place gives fuller details:

"At the invitation of Messrs. Rogers & Burchfield, last Friday, we visited their works at Leechburg, which have become so famous from the use of natural gas in the operations incident to rolling-mill practice. These works are situated on the right bank of the Kiskiminitas, about six miles above its junction with the Allegheny River. There are five puddling-furnaces, with two more building, six heating-furnaces, six trains of rolls, two steam-hammers, one refinery, two knobbling fires, two annealing-furnaces, and one 'stack' for terne plates, and two building for tin-plates. All of the heat and power required for this mill is from gas, excepting, of course, the charcoal used. This gas comes from a well in a ravine on the opposite side of the river, which was sunk for oil, but produces only gas and a small portion of salt water. The well was sunk some three years ago to a depth of 1250 feet, when it was abandoned, and for two years millions of cubic feet of gas were wasted. A little more than a year ago, the well was bought by Messrs. Rogers & Burchfield, and the gas conveyed across to their mill, a five-inch pipe being used. In the freshet last spring, the bridge on which the pipe was laid was carried away, and a three-inch pipe is in use temporarily; but through this more than enough gas crosses to run the mill, a large portion going to waste.

"In using the gas in the ordinary puddling-furnace, the only charge made has been to brick up the bridge, the gas being fed to the furnace through iron pipes, and the firing being done with a piece of lighted paper, the supply being regulated by an ordinary gate. The result is that the heat can be controlled at will without any more attention than the mere turning of a gate, and as fully a third of the labor at the puddling-furnace is keeping up the fire, this is no considerable item. It will also be readily seen that the complete absence from the fuel of any deleterious substance must have a great effect on the purity of the iron. The gas is a pure carburetted hydrogen, differing in this from that produced in the Siemens furnace, which is almost devoid of hydrogen.

"In addition to the use of gas, Mr. Rogers has lately introduced an improvement that seems productive of most astonishing results. What these are, we can only indicate at present, but as Mr. Rogers has kindly consented to allow of a series of experiments, we will give completer details in a future number. The improvement consists in blowing a blast of air upon the iron in the 'pool' of the puddling-furnace as it begins to boil. The pipes conveying the blast are carried in at the top of the furnace, and strike the molten metal at an angle with the surface of somewhat over 90°. At the time of our visit, a furnace fed with gas, and with the arrangements for blast as described, was charged with 460 pounds of Lucy forge pig, and a small amount of what the boiler called 'scrap tap'—that is, the cinder from the 'knobbling fires.' During the week, up to Friday noon, less than 500 pounds of ore had been used in feeding the furnace. No cinder was used when the iron began to boil, but the blast was put on, and the boiling was complete, the cinder in the iron flowing liquid. The furnace is charged for the first heat at 3.30 A. M., and the first turn is through with five heats at 11 A. M.; the second turn at 7 P. M.—the average of the five heats with 460 pounds charge being about 2400 pounds.

"The quality of the iron is somewhat wonderful. With the ordinary gray coke iron, sheets for tin plates, equal to those from the best charcoal iron, are made at a cost of $50 per ton less. The knobbling fires are dispensed with, and all their iron made with the use of gas and blast. Want of space prevents us going more into details this week, but in a future issue we expect to give the results of some careful experiments."

Kanawha Gas Coals.

[We find in the *Engineering and Mining Journal*, the following interesting communication.]

CHARLESTOWN, WEST VA., April 23, 1875.

Sir: It has been often claimed that many of the coals from the Kanawha Valley are admirably adapted to the manufacture of gas; but heretofore, with the exception of the cannel from Peytona, on Coal River, and Cannelton, on the Kanawha, no results of practical tests have ever been made public.

Early in 1874, the chairman of the Committee on Light and the Superintendent of the Richmond, Virginia, City Gas Works, in the hope of making favorable terms for the introduction of our illuminating coals, paid a visit to this valley and examined several of our mines. From their annual Report for the year ending 31st of January, 1874, we see that:

"Several companies tendered samples of their production in quantities sufficient to thoroughly test the illuminating power of each. In this way 6132 bushels were presented to the city, and from them were obtained the following results:

Colliery.	Operators.	Bushels.	Cubic feet per lb.	Candle power.
Lewiston	J. B. Lewis & Co.	993	4.36	15.
Coalmont	Repplier Bros.	1093	4.33	17.10
Houston M. and M. Co.	Houston M. and M. Co.	879	4.59	17.
Coalburg	Stewart M. Buck & Co.	951	3.81	14.5
Hampton	A. B. Ault	609	4.10	15.5
Gordon and Seal	Gordon & Seal	648	3.60	13.8
Cannelton Coal Co.	Cannelton Coal Co.	1049	3.07	14.

Miles above Charleston	Colliery.
13	Lewiston
13¾	Coalmont
14	Houston M. and M. Co.
17	Coalburg
19	Hampton
21	Gordon and Seal
26	Cannelton Coal Co.

N. B.—The Cannelton coal above noted is the coal that lies above the cannel in No. 4 seam.

"The coal from the Houston, Coal Valley and Replier mines is superior to any tested so far; is more free from slate and sulphur, produces greater heat, yields more gas, and makes the best coke."

It will be noticed that Coal Valley (which is immediately opposite Cannelton and works a seam corresponding to No. 2 of that company) is not given in the above table, but during a recent visit to the Richmond Works I learned that it yields 4½ cubic feet of 17 candle power.

As all these coals are very pure, the results given would seem to show that, other things being equal, the nearer the article approaches to pure splint the less valuable it is for gas. Thus: that shipped from Gordon and Seal shows the worst, being more of a true splint than any of the others. Next comes that from the top of the cannel at Cannelton, having the "splinty" character modified, by small interstratified seams of bituminous in the one case, and a slight admixture of cannel and bituminous in the other. These are followed, in the ascending scale, by Hampton and Lewiston, which, having a greater percentage of bituminous in them, give a larger yield and stronger candle power. Finally, the hard, thorough bituminous coals from Houston, Coal Valley, and Coalmont show the best results.

During the visit to Richmond, before alluded to, I obtained the following additional facts concerning our coals.

Last year the Gas Works of that city carbonised about 10,000 tons, of which nearly one-fourth came from Kanawha, and most of the balance from the Clover Hill mines in the Richmond coal field. The yield of this latter was 4 cubic feet of 13 candle-power, while the average of Houston, Coal Valley and Coalmont was 4·4 cubic feet of 17 candle power. As regards the amount of hydrate of lime necessary for the purification of the gas, Kanawha was to Clover Hill as one to two; and delivered at the works, the coal from the former was only 25c. per ton more than the latter.

There is another analysis of Cannelton bituminous. It is from seam No. 2, which is 7 ft. thick and about 100 feet above the river. The Company expect to be shortly shipping from it, and are now building a railroad, ¾ of a mile long, to the entrance of the mine. In 1871, C. M. Cresson, of Philadelphia, analysed samples from this bed, and in his report to the Company speaks of it as follows:

"No. 2 is a bituminous coal of first rate quality, and is especially adapted for gas-making. It exceeds in value for such purposes the best bituminous coals in use in this or the New York markets, by about 7 per cent., and is remarkably free from sulphur. One pound of coal yields 4·4 cubic feet of 15 candle-power."

Of our cannel coals only two have been been tested, viz.,: that from the Peytona Cannel Coal Company, on Coal River, and from the Cannelton Coal Company on the Kanawha. The former, as tried by the Manhattan Gas-Light Company, of New York, gave the following results when subjected to the ordinary method of dry distillation:

Charge 224 pounds.

Maximum yield of gas per 2240 lbs. = 13,200 cubic ft of 32·66 candle-power.

At 10,000 cubic ft. per 2240 lbs. (standard yield), the illuminating power was 41·16 candles.

2240 lbs. of coal gave 1380 lbs. of coke and breeze, or 32 bushels of breeze. The coke is poor, making a dull fire and a large bulk of light ash.

One bushel of lime purifies 4510 cubic feet of gas. Refrigerated to 6° F., the candle power fell from 41·16 to 35·99, burning from a fishtail burner—a loss of 5·17 candles, or 12½ per cent. of its illuminating power. Another sample of larger volume, having a candle power of 29·24, lost 1·04 candles, or 6·6 per cent.

The mean of six trials with 100 lb. charges, by the hydrocarbon process gave

Gas from 2240 lbs.....22,400 cubic feet.
Candle power of 1 cubic foot.... 4·65 candles.

Analysis of the coal:

Volatile matter.....46 per cent.
Fixed carbon.....41 "
Ash.....13 "

The Cannelton Cannel was also tested by the Manhattan Company, and yielded as folllows:

Charge, 224 pounds.

Yield, per 2240 lbs., 10,000 cu. ft. of 64·54 candles.
or, 12,625 " 45·6 "

Coke, 32 bushels, weighing 1320 lbs., quite light, burns freely, making very hot fire.

Analysis;

Volatile matter.....58 per cent.
Fixed carbon.....23·5 "
Ash.....18·5 "

The illuminating power (64·54 candles) for a yield of 10,000 cubic feet is so large that I cannot but think that there must be some mistake in the printed report in my possession; for in 1871, when Dr. Cresson analyzed the same coal (the results of which were published by the Company) he found 5·2 cubic feet per pound equal 11,648 cubic feet per ton, and to 3·15 cubic feet ascribed an illuminating power of 15 candles, though he mentioned, in a second report to the

Company, that these were the results of an average of the whole lot sent for analysis, including a portion of coal containing thin seams of slate.

M. F. Maury.

[The writer seems quite right in suspecting something wrong in the figures he quotes about the coal last mentioned. We do not know where the trouble is, but the amount of coke stated in the analysis, 42 per cent., is far from agreeing with the 1320 lbs. per ton, also stated.—Ed.]

Correspondence.

[Correspondents, in all cases, should sign their communications with their names and address in full—not necessarily for publication, but as a guarantee of good faith.—Ed.

Mr. Coombs, in Reply to Mr. Sabbaton.

Youngstown, Ohio, July 20, 1875.

Mr. Editor: I notice in your last issue a communication from Troy, N. Y., from Mr. F. A. Sabbaton, the subject of which (hydraulic-main) attracted my attention to such a measure, as to induce me to give you my experience in using this main. I must say it has resulted quite differently from that of Mr. Sabbaton.

The objection the gentleman gives to using this kind of main is "baking or thickening of its contents." Now this is new to me, as I have never been troubled in this way at all, so far. My hydraulic main on this plan (see cut in Journal, July 2) has now been in operation two years steadily. The distance from the main to the floor is about eleven feet. As regards heat I believe it has stood the test. My charges are run on four hours time, with 300 lbs. coal per retort, or 900 lbs. to the bench.

I would say, however, that I have always used the improved ascension pipe, or water jacket, in connection with this main: which may have relieved me from the troubles that Mr. Sabbaton experienced. I have used both kinds of main. My experience is that my new main troubles me no more, in regard to its keeping in perfect running order, than the old one did; to say nothing of the advantages I get by using it.

In relation to, and concerning the contents of main, my notion is to keep as good a circulation as possible on the bottom of the main. This we do in part by having the tar run off on bottom of main, thereby helping it to keep thinner, and less liable to bake in the main.

Respectfully yours,

M. Coombs, Jr.

Mr. Somerville's Letter.

Pittsburgh, Pa., July 23, 1875.

Mr. Editor: In your last issue Mr. Somerville, Superintendent of gas works at Knoxville, Tennessee, makes some assertions at which I am astonished. I cannot believe that he speaks for any considerable number of the gas fraternity. As matters at present stand, there are but two alternatives presented to gas companies in relation to petroleum. It offers itself to them as their competitor or their ally. In one form or the other they are forced to accept it. As I understand it, the object of the gas companies is a purely business one—to make money by the manufacture and sale of illuminating gas. Several elements enter into the question of profit to them. The cost of buildings and machinery, the relative cost and value of crude material, the amount of competition they must contend with, the quantity of their product that will be consumed in the market they propose to supply, and the price they can obtain for it. Coal has been generally adopted by them as on the whole the best gas producing material; all their machinery is adapted to its use, and all their experience has been connected with it; but the plant required for its manufacture is so expensive, that only in large towns can the manufacture be made profitable, and even then at prices which prevent its use by the poorer and most numerous class of inhabitants. If the cost of plant could be considerably reduced, this alone would permit a reduction of the price of gas, which would greatly extend its use without disturbing the profits of manufacture; but if in addition to this, a material can be found from which a gas of equal quality to that now sold, can be made at a less cost, then a still further advantage is offered. It is generally understood, and Mr. Somerville admits that the cry of the public is for "good and cheap gas."

Now, petroleum stands today as the only important competitor with gas. Its discovery in inexhaustible quantities has made it the cheapest artificial illuminant the world ever had—the light it affords in properly constructed lamps is equal in quality to the average gas-light, and far better for the preservation of the eyes. Large numbers of people, even in gas-lighted cities, use it in preference to gas, and their number is constantly increasing. The competition of petroleum is formidable, and in this respect it affects in an important degree the profits of gas manufacturers. But it is asserted that gas can be manufactured from petroleum, with less costly machinery, of equal quality, and at less cost than from coal. Indeed it is said that this not only *can* be done, but that it is being done at many points in different parts of the country—the statements come from sources too numerous and too reliable to be passed over as idle rumors; if they are true, they are decidedly important, for they offer a means of largely increasing the business and profit of gas manufacturers, and at the same time satisfying the public clamor for cheaper gas. But, Mr. Somerville says—"do not discuss this matter"; "has not petroleum gas been before us for 8 years?" "Are there not seventy processes for making it?" "Can we call spirits from its vasty depths that do not exist there?" "What further investigation do we require?" The gentleman is prolific of questions but barren of answers—let us furnish the latter for him. The question of the value of petroleum as a gas producer has never been investigated by the gas fraternity in the thorough searching manner that the importance of the subject warrants. The attention of careful, skilled, scientific men is needed; men who cannot be deceived by superficial appearances, and who are interested in neither oil wells nor coal mines. Oil gas has had "many fair trials, both on a large scale and a small," and although in many cases it has failed, in many others it has succeeded. Prominent among the failures will be found the trials, like the one Mr. S. alludes to in his own neighborhood, in which a process was used "which was a combination of all the latest inventions."

Prominent among the successes can be named cities like Detroit, Chicago, and Pittsburgh, where the use of petroleum, either as an enricher or a substitute, has been an acknowledged success for a long time—these are not the only places where the trial has been successful. There are over eight hundred gas companies now in operation, and nearly fifty of them are using petroleum successfully. I do not know what processes they are using, neither do I care. The gas companies need not interest themselves especially with the "seventy processes." They do not need to investigate trials that have been failures. It would be "a new thing under the sun," if there were no failures in developing a new branch of industry—possibly such things occurred in the earlier days of coal-gas making; but if there are places where the manufacture of illuminating gas from petroleum is being carried on with success, and better results obtained than from coal, then it becomes the gas fraternity not to say "We will not discuss petroleum gas," but as prudent, sagacious, business men, to investigate the processes in use at these places, to the very bottom.

Very truly,

Silas H. Paine.

Protecting Cast Iron Pipes.

The water from mines frequently contains enough acid to attack cast iron pipes, destroying them in a short time. Oil colors and varnishes offer but a limited resistance, and the process of enamelling employed in Oberschlesia, says M. Englehardt, of Ibbenburen, although permanent and effective, is expensive. Cement is cheaper, and is not acted upon by these waters, and the only question to be settled was whether it would adhere to the smooth iron with sufficient firmness.

Two similar pieces of rolled iron were taken, and one of them painted over five times with a very thin cement, so that the coating was 0·15 or 0·20 of an inch thick. Both pieces were suspended near together in that part of the shaft where the water had attacked the signal cable most violently, and were left there for months. On taking them out, the unprotected iron was found to be reduced to one third its original thickness; the other, in which a hole has been bored to suspend it, had suffered the same corrosion at the exposed portion; the cement covering was dark brown, but perfectly hard and unattacked by the acid. The cement was broken off, and the surface of the iron exhibited the dark blue color and luster that it had on leaving the rolls.

As this coating adhered so well to the smooth rolled iron, to which it cannot cling as tightly as the rougher surface of cast iron, the experiment was continued on a larger scale. A 24-inch discharge pipe in the Oeyhausen shaft was protected on the inside with cement. The coating remained unchanged for two years, while the pump was in constant operation. At the beginning of last winter the pump was stopped; and the pipe being no longer under water, the cement was so much injured by the frost that it scaled off. Several other experiments were made with similar results.

The pipes should be new, or, if old, well cleaned from rust before applying the cement, which is mixed as thin as is possible without injury to its tenacity. The pipe is moistened before the cement is applied, a thin coating of cement is put on and allowed to dry; when hard, it is moistened and a second coating applied, and so on four or five times. The operation cannot be conducted so well in hot weather, as the cement dries too quickly: nor must the pipes be exposed to frost during the operation or afterward. This unfortunate sensitiveness to cold may, perhaps, yet be overcome by intervening some semi-elastic material between the iron and cement.—*Sci. Amer.*

Rather Disparaging.

On the comparative expense in hospital use for heating purposes, of English and American cannel coal, Dr. N. Folson rsports the following experiment, which has lately been tried at the Massachusetts General Hospital. Two rooms of the same size, and similarly situated, were selected for the experiment. The temperature in each was kept as nearly uniform as possible for twenty-four hours. The thermometer outside the building varied from 15° F. to 3° F., while the temperature of the two rooms averaged 62·1° F. The result of the experiment was as follows:

The American coal does not have the luster of the English, being much duller in appearance. It comes in larger lumps and burns with decidedly less flame, leaving behind a very large amount of ashes. On first igniting it snaps badly. If left to itself for a considerable time it coats itself with fine white ashes. The English coal, on the other hand, gives out a more agreeable heat, and burns with a bright and far more attractive flame. It does not snap, and can be kept a long time without requiring any attention. The American coal used in the experiment cost $14 a ton, while the English cost $24. The weight of coal burned was as follows: Of American coal, 70 pounds, at a cost of 49 cents; of English coal, 35 pounds at a cost of 42 cents. In other words, the expense of the English coal was one-seventh cheaper than the American, without taking into account the extrs amount of labor required to carry the additional quantity of American coal.

[The American coal used, from the description, must have been much more ashy than a good *Kanawha* cannel.—Ed.]

Life and Thin Air.

Dr. Jourdanet has lately brought out in Paris a work entitled, "Influence de la pression de l'air sur la vie de l'homme," in which he gives some most interesting results of investigations on life at high altitudes, especially in the elevated districts of Mexico. The want of oxygen begins to make itself seriously felt at a height of 2000 meters, and it is at this point that Dr. Jourdanet draws the line between *climats de montagne* and *climats d'altitude*. Here the *mal de montagne* begins to affect travelers engaged in ascent, and the regions above afford an interesting subject of study. The Mexican of high altitudes is distinguished from his compatriots of lower regions by apathy and a love of repose. The annual increase of the population is only three per 100, whilst that in the regions between the plateaus and the sea is six or seven per 1000. Infant mortality during the first year is very high, and, notwithstanding the mildness of the temperature, reaction against disease is as feeble as was to be expected from the debilitated constitution of the people.

Some experiments on animals, undertaken in Paris by M. Paul Bert at the suggestion of Dr. Jourdanet, demonstrate the fact that, while from normal air confined in a receiver, an animal exhausts nearly all of the oxygen before death, under a lighter pressure far less of the oxygen is abstracted, showing conclusively that a certain barometric pressure is indispensable in order that the lungs may get the full advantage of the 21 per cent. of oxygen contained in the air. At the ordinary pressure there remained at the death of the animal, only three or four per cent. of oxygen, while, as the pressure was diminished, a proportionally larger quantity was found not to have been utilized. Dr. Jourdanet deduces some conclusions respecting the advantages of mountain air for invalids, and accounts for the decay of the Peruvian civilization and the manifest decline of the population of Thibet.

Natural Gas.

There is little doubt that the gas escaping constantly from oil wells is of nearly or quite as much value as the oil itself; and it is a matter of wonder that means have not long since been adopted to utilize this immense product of the earth. No estimate can be made of the quantity of this gas, which has for years been allowed to pass away into the air uselessly; but the yield of a few gas wells which have been tubed and their product utilized, indicates that it is enormous.

A gas well near Sarversville, in the Butler oil region, flows with a pressure of 300 pounds to the square inch, and is roughly estimated to yield a million cubic feet of gas every twenty-four hours; and this is only one of quite a number of large gas wells, and almost numberless small ones, for it must be remembered that every well which produces oil, also yields gas. A survey has just been completed for a line of pipe from Sarversville to Pittsburgh, a distance of about seventeen miles. It is proposed to lay a six-inch pipe between the points named, and to supply the gas to manufacturing establishments here as a substitute for coal for fuel.—*National Oil Journal.*

Dust as a Cause of Catarrhal Affection.

This is beginning to be recognized by the members of the medical faculty. Some years ago the present editor of the *Artizan* contributed to some journal, the name of which he cannot now recall, the result of his experience with acute attacks of inflammation of the naso-pharyngeal membrane, affirming his opinion that city dust caused this inflammation in many instances. His attention was attracted to this subject from the great relief he experienced through short voyages at sea, and the recurrence of the attacks upon his return to the city at a time when the streets were exceptionally dusty.

Dr. W. H. Bennett, of New York, has contributed to the September number of the *Medical Record* a very able essay upon abnormal conditions of the superior air-passages and some of the causes of chronic inflammation of these parts, in which he ranks dus as one of the most efficient causes. He thinks he has proved satisfactorily that chronic catarrh may be produced by the action of dust, through experiments upon animals forced to breathe air which contained no more dust than is frequently seen in air in certain parts of the business portions of New York. Dust issuing from the registers of houses heated by hot-air furnaces, and dust of streets—which is a combination of nearly all substances, filthy and otherwise, known to mankind—he regards as more effective in producing these complaints than clean earth-dust and dust occurring in various manufactories. It seems certain that chronic catarrh is more prevalent in cities than in country districts. Dr. Bennett estimates that at least four or five out of every twelve in the city of New York, irrespectiqe of their calling or profession, suffer from chronic inflammation of some part of the respiratory membrane situated above the trachea. Naso-pharyngeal catarrh, he states, is extremely prevalent among the conductors of the city horse-cars, and this disease is always aggravated when the streets are dry, and the consequent amount of dust dragged after the cars is excessive.—*Amer. Artisan.*

Tests for Oils.

The testing of oils, in a simple mode, has always been a desideratum. Miss Kate Crane, in the *American Journal of Pharmacy*, gives an account of a series of experiments instituted by her, which tend to show that much reliance can be placed on the cohesion figures produced by dropping oils on the surface of clean water. In her experiments, a single drop of oil was allowed to fall from a burette held at a distance of four inches from the surface of a dish of clean water. The time required for the production of certain figures was carefully noted, as it appears that several oils will produce very similar figures ultimately, if sufficient time be given. Oil of turpentine spreads out instantly and begins intestine motions, and lastly forms a beautiful lacework. Oil of cinnamon forms a figure not more than half the size of the above. In a few seconds, small portions are detached and separate into distinct drops. Oil of nutmeg forms a large figure instantly, the edge showing a beaded line. Poppy seed oil spreads instantly to a large figure, retaining an unbroken form for a few seconds: then holes appear round the edge, and soon the whole surface is broken up with curved lines. Cod liver oil spreads into a large film; a little way from the edge small holes appear, and in a minute or two the surface is studded with them. These gradually enlarge, assume irregular shapes, and become separated by branching lines. As these oils give different figures, and behave differently when mixed with one another, or with lard oil, this method may be of very great use in the preliminary testing of suspected oils.—*Scientific American.*

Reform in Cooking.

The British people have evidently taken hold of the cookery reform in their usual solid way. The recent annual meeting of the National Training School of Cookery was held at Stafford House, the residence of the Duke of Sutherland, and was well attended by "the nobility and gentry." The Princess Louise was present, and the Duke of Westminster took the chair. The secretary's report showed that the school had been in operation since March, 1874; 765 pupils have passed through it, of whom 108 have presented themselves for examination and have obtained "learners' certificates." Three have obtained full diplomas as teachers and remunerative employment.

The lady superintendent of the school, Lady Baker, has announced her resignation, being about to leave England. A beginning has been made in teaching cookery in elementary schools, and Sir H. Cole announced that the Committee of Council of Education have ordained that every girls' school wherein the pupils pass an examination in "food and its preparation" and in "clothing and materials" will receive an addition to its annual grant.

In the training colleges also throughout the country the practical teaching of cookery will now, to the extent of two-thirds, be paid for by the State. One speaker said that he had lectured in Cambridgeshire, where a farmer complained that he would make the men unwilling to work by showing them how to live on four pence a day. With this example in England, training schools for cookery will doubtless soon become numerous and fashionable in this country.

Metallurgical Hash.

For the restoration of burnt steel, M. Kulicke, of Berlin, recommends the use of a mixture having the following composition: 180 grms. of tartaric acid, 900 grms. of cod-liver oil, 60 grms. of charcoal powder, 240 grms. of bone-black, 300 grms. of beef tallow, 150 grms. of potassic ferro-cyanide, and 90 grms. of burnt horn. These ingredients are thoroughly mixed, and the steel, after being heated to cherry-red heat, is hammered on an anvil, then dipped in the mixture, and afterwards in water. The results are said to be very good. For case-hardening, the same chemist recommends the use of a mixture of 10 buckets of urine, 2·5 kilos of chalk schlamm (schlammkreide), and 2 kilos. of salt. Articles of soft steel heated to a red heat, plunged into this mixture, and then cooled, were found to be well case-hardened. On attempting to use this for large articles, however, an unendurable stench was caused, which drove the workmen from the workshop.

[Such messes as the above are often met with nowadays. In noticing one of them, our ingenious contemporary, the *Iron Age*, exhorteth thus:

"A correspondent in a western town sends us a recipe for making a compound for welding steel. It is as follows: 6 oz. copperas, 4 oz. lamp black, 1½ lbs. salt, 3 oz. prussiate of potash, ½ oz. iodide of potassium, 1 oz. plumbago, 10 lbs. iron filings, 3 oz. oxide of manganese, 1 lb. caustic soda, 2 oz. sulphate of copper, 3 oz. iron rust, 3 oz. litharge, 2 lbs. borax, and 25 lbs. white sand. We have not tested the compound, but are much obliged for the recipe. If we may venture a suggestion, we should say that the compound might be improved by adding 2 lbs. green tea, 2 papers fine cut chewing tobacco. 1 pint of vinegar, 1 oz. red pepper, and sugar to taste. These ingredients would certainly do no harm, and, perhaps they might improve the compound."

Fire-Proof Starch.

In order to make ladies' apparel fire-proof, a starch is used to which sulphate, phosphate, or borate of ammonia, or what is better, tungstate of soda is added. It appears, however, according to Prof. Gintl (a competent authority in such matters), in his report on practical chemical preparations at the Vienna exhibition, that manufacturers who apply them do not always act with the correct understanding, and do not consider that the compound used must be perfectly neutral and not impure; that it is not sufficient to use the ordinary commercial article, for instance tungstate of soda, which often contains considerable quantities of carbonate of soda, or ordinary sulphate of ammonia, and this is especially very impure, so much so that the impurities cannot stand the application of the hot iron during the process of ironing, without ruining the color as well as the texture of the material.

The result of such mistakes is that the fire-proof starch has not become of universal application, and as long as the makers of this preparation do not use the most scrupulous care in its manufacture, its universal introduction is out of the question.

☞ *For other reading matter see page 50.*

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MONDAY, AUGUST 2, 1875.

WISHING TO MAKE THIS JOURNAL an organ of intelligent discussion to those of our readers who may wish to gain or give information on the subjects to which its columns are devoted, the publishers solicit letters from all among them who make the study of these subjects a pleasure, or a profession.

Subscribers would confer a favor upon us by remitting *CHECKS*, or *POST OFFICE MONEY ORDERS*, as we are frequent losers where money is enclosed in letters.

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CONTENTS.

☞ An asterisk (*) denotes an illustrated article

Third Semi-Annual Meeting of the American Gas-Light Association.. 41
Chemical Excerpts. 43
Metropolitan Gas Monopoly..... 43
Application of Illuminating Gas to the Pyrophone..... 44
Puddling with Natural Gas..... 45
Kanawha Gas Coals..... 45
CORRESPONDENCE—
Mr. Coombs in Reply to Mr. Sabbaton... 46
Mr. Somerville's Letter..... 46
Protecting Cast Iron Pipes..... 46
Rather Disparaging..... 46
Life and Thin Air... 47
Naturnal Gas. 47
Dust as a Cause of Catarrhal Affection..... 47
Tests for Oils..... 47
Reform in Cooking..... 47
Metallurgical Hash..... 47
Fire Proof Starch..... 47
EDITORIAL—
The Gas-Light Association..... 48
The Pyrophone..... 48
New Methods in Siderurgy..... 48
An Obligation Fulfilled..... 49
Light-House Illumination..... 50
Gas Stocks..... 50

THE GAS-LIGHT ASSOCIATION.

This issue closes our Report of the Washington meeting of the Association in May. There seems nothing of much importance to add, at this late day; except to reiterate our congratulations at the evident success of the occasion, and our hope that the interest which is evidently growing, in these national gatherings, may not be allowed to flag; and that the next meeting—which, we believe, must be held according to the Constitution, in New York City—may turn out to bring together a still larger number of the profession.

THE PYROPHONE.

In this number is given the best account we have yet met with, compressed in a reasonable space, of the so-called pyrophone, or gas-organ, as it may be called.

If the tales that are told may be trusted, the thing is well-worthy of the consideration of gas-men, in view of the fact that its coming into fashion could not fail to add a new and not unimportant mode of *gas-consumption*. This is one of the developments of the age that we shall look to have treated with some attention by our Gas-Light Association; since all that promotes an increase of consumption of gas must tend to the advantage of the profession generally, in the end. Indeed we do not know why the Association should not occupy itself directly and actively in carrying out means to instruct the people generally in new modes of utilizing gas; as for warming rooms, cooking, obtaining currents of air for ventilation, for gas-motors, and so on. If the members generally should possibly concur with Mr. Somerville, in his letter in the issue before this, that petroleum, and material for making gas generally other than coal, ought to be "read out" of the Association, and tabooed; there will still remain this subject of increase of gas-consumption at least, for discussion. As we have before said, however, our fear would be that if this new material—mineral oil—is going to be treated with magnanimous contempt and cast out in this way by the profession, the actual result may turn out to be *decrease* of gas-consumption.

To come back again, however, to the pyrophone. The accounts would seem to indicate that this interesting machine may come into use to some extent, and it behooves therefore every well-read gas man to know something about it. We commend therefore the article copied to-day to the attention of our readers.

NEW METHODS IN SIDERURGY.

The investigation into the new system of Eames, of working iron-furnaces with the vapor of petroleum, at the special furnace which was fitted up for the purpose by the inventor in Jersey City, has been completed; and the results and conclusions will be published now, in a few days, in the form of an elaborate Report in the columns of our contemporary, the *Engineering and Mining Journal*, to which, as the representative Journal in America—we may say the very worthy representative—of the Science and Practice of Rational Metallurgy, including Siderurgy, it has appeared to us that it is due we should communicate directly the account of this work.

This Report comprises, first, of course, an explanation and specification, with cuts, of the new apparatus; an account of previous attempts of others in the directions of iron and steam making with petroleum; a discussion of the chemistry of petroleum, and of its calorific power and capacity; citations of the opinions and expectations of men of science throughout the world regarding oil-fuel, both for steam-making and siderurgy; results of examinations and tests of the iron (boiler-plate) manufactured in Jersey City, by Professor Thurston of the Stevens Institute of Technology, and by the writer, in conjunction with Mr. Rothwell, co-Editor of the *Engineering and Mining Journal*, who was kind enough to give his co-operation in this special matter, of the *temperature* of the fire-space of the petroleum-furnace, and of the chimney-gases after having passed the boilers; facts and figures regarding the operation of the new fuel as compared with coal, with estimates of relative material, time, labor and cost; accounts of the previous experiments upon puddling, etc., under the Eames System; winding up with some remarks upon petroleum-production, appropriate to show the availability of this new fuel.

We cannot take the liberty to quote Professor Thurston's figures upon the tensile strength and elasticity of the iron, in advance of publication; but will say they are highly satisfactory. The writer examined the boiler plate with reference to its internal structure, and is enabled to present, as exhibits accompanying this report, a novel kind of *prints made directly from the fibre* or *laminæ of the iron*, developed by chemical means. These are to be shown in comparison with some similar impressions made from common boiler-iron of commerce.

Without anticipating further in this matter, we will only state that the most remarkable—even altogether unsuspected—result, of the investigation, has been the development of an actual and marked *economy in cost* of equal work done with oil, over the most recent and improved processes with coal; in addition to other important advantages, which all men of science have admitted and anticipated. This economy is due chiefly to the intensity and concentration of the heat, which, being analogous to that of a huge blowpipe, enables high heats to be attained of considerable masses of iron in *times much shorter* than with any other fuel in use.

The improvements in the applications of fuel in furnaces that have been made of late years, have already accomplished almost to a revolution. More especially has the introduction of the Siemens-Martin furnace, with the Regenerator, in iron-working, led to the most wonderful results, no less than a saving of *half the fuel*, besides a considerable proportion of the metal that is lost, with coal fuel, from unequal heating and irregularity in the oxidizing power of the flame, leading to the burning of the iron (or steel) in parts; the difficulty being that of obtaining what is called a "a neutral" flame. This difficulty is one of those in managing all siderurgic furnaces, which naturally yields at once to the use of *gaseous fuel*, of any kind.

In this connection, we ought not to omit some reference to the remarkable results which are being obtained, at points in Western Pennsylvania and elsewhere, in the application in siderurgy of *natural* gas, which is emitted freely from the earth in so many places. In this issue we copy an account of the operations at Leechburg, some 25 miles northeast of Pittsburgh, up the Allegheny River; which will furnish a sample of what is to come of the introduction of fuels that can be conveyed in gaseous forms.

The subject is one which all thinking men in the gas profession will not fail to keep track of. Some things are to come of all this, important to

them in many ways; and which we shall take occasion to enter upon in future columns.

AN OBLIGATION FULFILLED.

It is now a number of weeks since the letter given below was received from Mr. Ellerbeck, of Salt Lake City. Some correspondence having resulted with Mr. Ellerbeck, preliminary to our undertaking to reply to his inquiries through these columns—considered by us the proper place and mode in which to make such reply—the matter was laid aside, and, though not forgotten, overlooked; as such cases are sometimes liable to be. We trust Mr. Ellerbeck will accept this explanation, though we must confess its tardiness and inadequacy:

OFFICE OF SALT LAKE CITY GAS CO.
May 25, 1875.

Mr. Editor: You will greatly oblige me by answering through your valuable publication, or otherwise as may be convenient, the following question:

Suppose a quantity of plaster-of-Paris in its natural state, but rudely crushed, be placed in a vat, and the resulting gas liquor from the scrubbers be allowed to saturate the plaster, would the compound be available for manure without further loss? Also—would the plaster absorb and retain the ammonia for a lengthened period so as to bear transportation, storage, etc.

Very respectfully,
T. W. ELLERBECK, Manager.

REPLY.

Our apology to Mr. Ellerbeck should be supplemented and emphasized by saying further that his question is of a specially high order of intelligence and, it may be, of practical importance, for us to receive in this way; and that we should therefore have been thankful for the opportunity, and should not have pigeon-holed his letter in so reprehensible a manner.

Nevertheless, chemically considered, the question of Mr Ellerbeck scarcely admits of an absolute and categorical answer—yes or no—and will require a moderate degree of circumlocution to get around it. Gas-liquor may be looked on chemically, and for simplicity, as substantially made up of two compounds, *carbonate of ammonia* and *hydrosulphate of ammonia*. But the relative proportions of these two constituents will depend on many circumstances which vary within wide limits, among them being probably chiefly the amounts of sulphur, combined water, and oxygen in the coal that is carbonized, the degree of the heats on the benches, possibly the length of time of running the charges, and certainly the temperature at which the liquor is condensed.

We have no idea, even if all these points were distinctly defined, that in the present imperfect condition of our knowledge, the Gas Chemist exists, on the known surface of the Earth, who could make more than a "shrewd guess" at the relative proportions of the two main constituents that would be found in the resulting gas-liquor. It would be reasonable to expect that the less sulphur there was in the coal, the more *carbonate* of ammonia in the liquor; but this conclusion would be subject to some of the other conditions mentioned, especially to the temperature of condensation and the amount of moisture present. We are, of course, assuming the simplest case, of a simple spontaneous condensation of the liquor from the gas, without the use of additional water—We may assume also, no doubt, that, in the case of an ordinary gas-coal, the carbonic acid would always be in excess. It seems probable, this being assumed, and the condensation being merely a spontaneous one, that the higher the temperature of the condensing surfaces, solid or liquid, or both, the larger the relative proportion of hydrosulphate of ammonia condensed, relatively to the carbonate, and the lower the temperature, the more carbonate and the less hydrosulphate; simply because at the lower temperatures carbonic acid decomposes hydrosulphate of ammonia. Another weighty circumstance here, however, is the *length of time* or duration of *contact* of liquor with the gas, at the lower temperatures. We might write several more columns—profitably possibly, on this important and interesting subject; but our printer would not find the said columns for us, in this issue at least; and the best we can do is to promise (if Mr. Ellerbeck and the profession generally care about it) to follow up with something more hereafter. Instructive laboratory experiments suggest themselves which would give immensely valuable information as to the true chemical theories of condensation and purification, as yet far from satisfactorily understood—but we must now take the little space left to give such partial answer as be, to Mr. Ellerbeck's question.

This is simply thus—

Mr. Ellerbeck's gypsum would certainly take up all the ammonia, existing as carbonate, into permanent, dry, and transportable combination. The ammonia present as hydrosulphate, on the other hand, would not, and could not, be at once taken up into permanent combination. On exposure of the mass to the air further permanent fixing of the ammonia would doubtless ensue, by virtue of the aerial carbonic acid, which would displace the sulphuretted hydrogen (with an odor, by the way, that would assert itself, and which might be as bad as *wet lime* purification used to be). This mass might also contain *sulphocyanides*, poisonous to vegetation. The subject is far from exhausted, but our space *is* exhausted.

☞ The attention of gas men is directed to the advertisement of George Coles, Esq., of Hagerstown, Maryland, which appears on this page. A perusal of the advertisemt will make its meaning apparent.

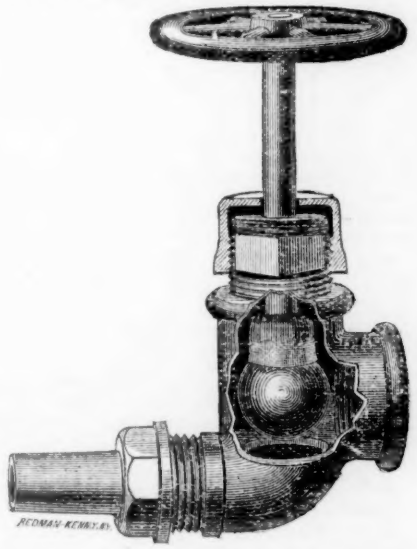
California Coal.

A very important article to every one here as elsewhere is coal. California though abounding in everything else has very little true coal. The lignites of some of the counties are now being utilized, however, and several new coal mines were opened during the year 1874. The receipts of coal in this city from all Pacific coast sources have largely increased during the year save alone from Bellingham Bay and the Rocky Mountains. About 325,520 tons were received in this city from Pacific coast mines, including 47,982 tons from British Columbia. The receipts of Mount Diablo coal during 1874 were 203,255 tons. The production of California, as represented by the Mount Diablo mines, has increased 33,455 tons. The deposits at Lincoln are, if the quality of coal be all that has been said of it, of the greatest importance to the future industrial development of the State. Other discoveries were made in the southern part of the State earlier in the year, but nothing has since been heard of them as is the case with several other localities.—*Scientific Press.*

TO GAS COMPANIES.

A MAN WHO FOR THE PAST TWENTY YEARS HAS performed the whole duties requisite in the Manufacture and Distribution of Gas, from Coal Shed to Consumers' Meter, at a Works in a town of 6000 inhabitants, desirous of making a change, is open for a new engagement. Can show some of the best working results, and some of the best plans of Setting and Working Retorts. Is also a good Gas Fitter. Would take the whole or part duties of a small, or any branch in a large Works. The best of reference. Correspondence solicited. Address GEORBE COLES, Hagerstown, Md. 387

SOMETHING NEW.
THE HUMPHREYS VALVE.
FOR USE AT CONSUMER'S METERS.



This valve is made of malleable iron, and is specially adapted to encounter the heat of burning buildings, in which the ordinary meter cock (made of brass) will crumble or melt. It is opened or shut with ease, by sliding the stem up or down, the latter being held where desired by the friction of the packing. It is perfectly tight, and is not so liable to get out of order as the meter cock: its cost being about the same.

The great advantage of this valve is, that in case of fire—when the gas cannot be shut off by hand, the heat will automatically close the valve, and thereby stop the flow of gas. The certainty of its action in this way will be at once apparent when it is observed that the valve proper is a round iron ball, attached with a soft solder composition (melting at 250°) to the end of the stem, and held directly over the seat. The heat of the fire, melting the solder, releases the ball, which drops into the seat, and shuts off the gas.

Peference is made, by permission, to the following gentlemen, well-known to the gas fraternity—H. Q. Hawley, President Peoples Gas-Light Company, Albany, N. Y.; Isaac Battin, Engineer Albany Gas-Light Company, Albany. N. Y.; F. A. Sabbaton, Engineer Gas-Light Company, Troy, N. Y.; S. C. House, Proprietor Union Gas Works, Lansingburgh and Waterford.

Send for price list to WILLIAM HUMPHREYS, Waterford, N. Y.

Sole Agency for the United States.
The PELOUZE & AUDOUIN Condenser.
Patents, May 26, 1874; July 21 1874.

ADDRESS

JAMES R. SMEDBERG,
Consulting Engineer, San Francisco Gas-Light Co.,
San Francisco, California.

OR

HENRY CARTWRIGHT. C. E.,
2107 Green Street, Philadelphia, Pa.

Prof. Gintl also calls attention to the fact that, according to his experiments, ammonia alum (sulphate of alumina and ammonia) and hyposulphite of soda are also additions to starch which make it very effectively fire-proof. This is important, as both are cheap substances, easy to obtain, and without any action on most colors. The latter substance prevents, if not so perfectly as some other compounds, a full inflammation, while it is a fact worthy of remark that the quality of the starch which causes it to give stiffness and gloss to the material to which it is applied, is not in the least affected.

Light-House Illumination.

At a meeting of the Royal Society of Arts, held in Edinburgh, Prof. Archer presiding, the first communication read was one by Mr. Thomas Stevenson, C.E., F.R.S.E., "On the Holophotal Combination of several Flames in one Optical Apparatus for Light-house Illumination." In the course of his paper, Mr. Stevenson mentioned that, in order to intensify the light shown from lighthouses sufficiently to render the signals visible during fogs, it had been suggested some time ago that the rays of light proceeding from a secondary flame should be utilised, so as to increase the illuminating power of the primary flame. In Mr. Stevenson's new apparatus, series of rays proceeding from each flame fall upon lenses or refractors surrounding it in the ordinary way, and are thus utilised, while those passing above the lower flame and below the upper, and which escape interception by the ordinary lenses, fall upon prisms of a kind which he had introduced at a lighthouse in Islay, and which are so made as to have their conjugate foci in the upper and lower flames, so that the rays in question pass through the flames, and are intercepted by the other optical agents. The rays from both the upper and lower flames, which pass above the upper flame are parallelised by an inverted truncated paraboloidal mirror. By this play or by means of dioptric agents on the same principle, the whole light from two or more flames is utilised.—*Iron.*

Gas Stocks.

Quotations by W. B. Scott & Co.,

24 Pine Street, New York City.

	Par.	Bid.	Asked.
Gas. Co.'s of N. Y. City.			
Manhattan	50	295	...
Metropolitan	100	157	...
" Scrip	...	106	...
New York	100	157	...
Mutual	100	102	...
Harlem	50	129	131
Westchester	50	100	105
Gas Co.'s of Brooklyn.			
Brooklyn	25	245	250
Citizens	10	...	152½
" Scrip	...	101½	...
Peoples	10	95	...
Bonds	...	98	...
Nassau	25	121	...
" Scrip	...	102½	...
Metropolitan	100	103	105
Williamsburgh	50	143	...
" Scrip	...	102¼	...
Ont of Town Gas Companies.			
Jersey City	...	160	...
Peoples of Jersey City	...	...	65
Peoples of Albany	...	45	...
Derby of Connecticut	100	...	80
East Boston, Mass	25	112	115
Woonsocket, R. I	100	100	...
Fort Wayne, Ind	100	...	105
Baltimore, Md	...	190	...
Lewistown, Maine	100	...	80

PRICES OF FOREIGN AND DOMESTIC GAS COALS.

[Reported Expressly for this Journal.]

July 2, 1875.

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Kirkless Hall	16 50	@	17 00

English Caking Coals.

Newcastle Gas	$12 00	@	00 00
Liverpool caking	11 50	@	12 00

British Province Coals.

Pictou			2 50
Block House—At Mines, $2 12, Gold			0 00
Caledonia—At Mines, $2 00, Goid			0 00
Little Glace Bay—At Mines, 1 87½, Gold			2 00
Lingan—At Mines, $2 25. Gold			0 00
Sydney—Old Mine			3 00
" Reserve Mine			2 2
" International			— —

(Duty, 75 cents per ton, gold. Freight to New York $2 25 currency. Cost of above coals delivered in New York, $5 25 @ $6 00½, currency.)

Pennsylvania Coals.

Penn Gas Coal—At Amooy	$7 00	@	0 00
Westmoreland—At Amboy	7 00	@	0 00

(In New York both the above coals $7 50)

Shafton	7 50	@	0 00
Youghiogheny	7 75	@	0 00

West Virginia Coals.

MurphyRun	$7 40	@	0 00
Despard	7 40	@	0 00
West Fairmont	7 40	@	0 00
American Gas Coal	7 40	@	0 00
Fairmont	7 40	@	0 00
Newburgh Orrel	7 40	@	0 00
Pinnickinick	7 40	@	0 00
Cloverhill of Virginia	6 00	@	6 50
McKenzie Compound Mixture			— —

American Cannel Coals.

Peytona of West Virginia	$12 50	@	00 00
Darlington of Pennsylvania			— —
Cannelton Cannel			12 50
Red Bank—at Philadelphia			7 60
" —at South Amboy			9 00

Asphalts.

Albertite of New Brunswick	$— 00	@	— 00
Ritchie Mineral of West Virginia	18 00	at	Balt'e,
Trinidad Bitumen	— —	@	14 05

The Waverly Coal and Coke Company of Pittsburgh, have contracted with the Pittsburgh Gas-Light Co. for 40,000 tons of their Youghiogheny coal, on private terms,

Advertisers Index.

☞ In looking for advertisements, see figures 1 to 12, within brackets, at head of advertisement pages.

GAS BURNERS, APPARATUS, ETC.

American Meter Co.—West 22nd st., N. Y., Arch and 22d sts., Phil., 324 Washington st., Boston 11
Cast Iron Gas and Water Pipe—S. Decatur Smith, York and Moyer streets, Phila., Pa 8
Cast Iron Gas and Water Pipes—R. D. Wood & Co., Philadelphia Pa 10
Cast Iron Gas and Water Pipe—Jno. McNeal & Sons, Burlington, N. J 8
Franklin Foundry and Pipe Works—Jas. Marshall & Co., 23 Nineteenth street, Pittsburgh, Pa 2
Gas Valves (Chapman) 75 and 77 Kilby St., Boston, Mass .. 3
Gas-Burners—C. Gefrorer, 248 North 9th st., Phila., Pa. .. 9
Gas Purification—St. John and Cartwright 5
Gas Meters, etc.—Harris, Griffin & Co., 12th and Brown streets, Phila., Pa 10
Gas Meters, etc.—Wm. W. Goodwin & Company, 1012 Filbert street, Phila, Pa 11
Gas Meter Manufacturers—Harris & Bro., 1117 Cherry st., Philadelphia, Pa 11
Gas Fixtures, Etc.—Archer & Pancoast Manufacturing Co. 67 Greene St. eet, above Broome, N. Y 2
Gas Fixtures, Etc.—Mitchell, Vance & Co., 597 Broadway .. 7
Gasholders, Etc.—Deily & Fowler, 39 Laurel st., Phila., Pa.. 4
Gas Screen—James P. Mahon, Boston, Mass 5
Gas Engineer—Henry Cartwright, Phil. Pa 4
Lime Hurdles.—Manhattan Lime Hurdle Co., Geo. W. Day, Treas., No. 3 Railroad Square, Haverhill, Mass 2
Lava Tips and Scotch Tips—Charles H. Meyer & Co., 227 Chestnut street, Phil. Pa 8
National Tube Works Co., 78 William St., N. Y 7
Patent Conically Slotted Wood Trays—John L. Cheesman, 147 and 149 Avenue C., N. Y 4
Patent Gas Exhauster—Smith & Sayre, 95 Liberty sttreet .. 4
Pelouze & Audouin Condenser—Jas. R. Smedberg, Sole Agent for U. S. · San Francisco, Cal.; Henry Cartwright, 2107 Green street, Phil. Pa 1
Petroleum Gas—J. D. Patton, Treverton, Pa 4
Patent Gas Exhauster—S. S. Townsend, Agt., 51 Liberty street, N. Y 3

GAS COALS.

Cannelton Coal Co. of West Virginia—J. Tatnall Lea, 325. Chestnut street, Phila, Pa 3
Despard Coal Co.—Parmelee & Bros., Agents, 32 Pine st., New York 7
Gas Coals—Bird, Perkins & Job, 27 South st., N. Y 7
Monongahela Gas Coal—56 Exchange Place, Baltimore, Md. 6
New York and Cleveland Gas Coal Company—384 Penn Avenue, Pittsburgh, Pa 6
Ohio Gas Cannel—G. Merryweather, Pine cor. Wm. sts.
Penn Gas Coal Co.—11 Merchants' Exchange, Phil. and 90 Wall street, N. Y 6
Peytona Cannel Coal—S. E. Low, 58 Broadway, N. Y 5
The Newburg Orrel Coal Co.—Chas. W. Hays, Agent in New York, Trinity Building, 111 B'way, Room 7 6
Tyrconnell Gas Coal—52 S. Gay Street, Baltimore, Md 6
Westmoreland Coal Co.—230 South 3rd Street, Phil. Pa 7
Youghegheny Coal—Perkins & Job, 27 South St N. Y 7

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Cast-Iron Pipes and Fittings—B. S. Benson, 52 East Monument street, Baltimore, Md .....
Continental Works—T. F. Rowland, Greenpoint 6
Camden Iron Works, Camden, N. J.—Jesse W. Starr & Son. 5
Gloucester Iron Works—J. P. Michellon, Sec., 6 North 7th street, Phila., Pa 4
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National Foundry and Pipe Works—Wm. Smith, Carroll, Pike, Smallman & Wilkins streets, Pittsburg, Pa 6
Oregon Iron Foundry—Herring & Floyd, 740 Greenwich street, N. Y 10
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Providence Steam and Gas Pipe Co., Providence, R. I.—H. A. Branch, Agent 3

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Water Pipes, etc.—S. Fulton & Co., 412 Walnut st., Phila ... 7

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Cheltenham Fire Brick and Clay Retort Works—Evens & Howard, 916 Market street, St. Louis, Mo .....
Manhattan Clay Retort Works, 15th st., near Av. C, N. Y .. 8
Philadelphia Fire Brick Works, Vine and 23d sts., Phila 8

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Patent Lamp Post—J. W. Graham, Chillicothe, Ohio, or A. M. Callender, office of this Journal 9

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Architect and General Gas Engineer—William Farmer, 111 Broadway Room 95, N. Y 5
Brass Cocks, Plumbers' Materials, etc., etc.—McNab & Harlin Manufacturing Co., 56 John st., N. Y 7
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Fodell's System of Bookeeping—A. M. Callender & Co., 42 Pine st., New York 1
Gas Engineer—B. E. Chollar, 914 Olive St., St. Louis, Mo ...
Gas-Light Company of America, 63 and 64 Drexel Building, New York 2
Kidd's Gas Consumers Guide—A. M. Callender & Co., 42 Pine Street, N. Y .....
Massachusetts Institute of Technology—Samuel Kneeland Boston, Mass .....
National Coal Gas Company—H. P. Allen, 4 Warren street New York 6
School of Mines, Columbia College, East 49th st 9
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Scientific and Practical Chemist and Geologist—Profetsor Henry Wurtz, 12 Hudson Terrace, N. J .....
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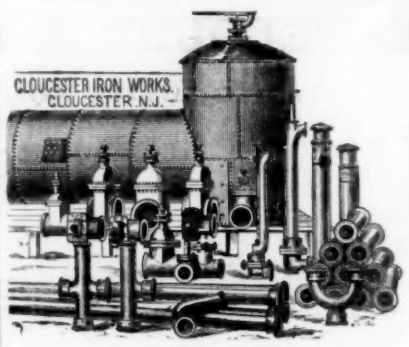
Slade's Automatic Fire Governor—Jas. Slade, Gas Works, Yonkers, N. Y .....



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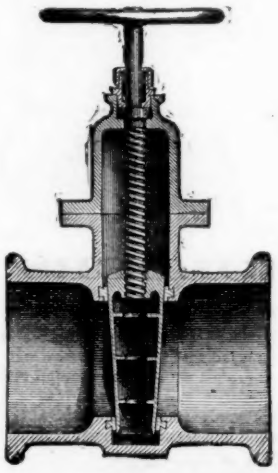

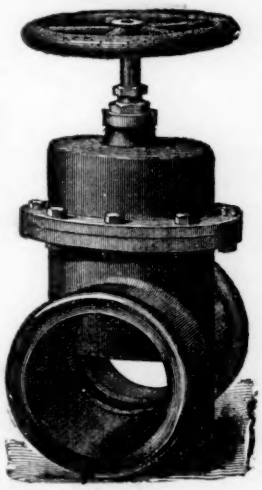

These Valves have been in use for several years, and are pronounced by all who have used them to be

The Best Gas Valves Ever Made.

They afford a direct passage the full size of the pipe. The seats are made of an alloy similar to BABBITT metal, specially prepared for the purpose, and superior to all other metals used for the seats of Gas Valves. It does not corrode under any circumstances to which it is exposed.

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PEOPLES GAS-LIGHT COMPANY, BROOKLYN, N. Y.
CITIZENS GAS-LIGHT COMPANY, BROOKLYN, N. Y.

SOUTH BOSTON GAS-LIGHT COMPANY, BOSTON, MASS.
CHARLESTOWN GAS-LIGHT CO., CHARLESTOWN, MASS.
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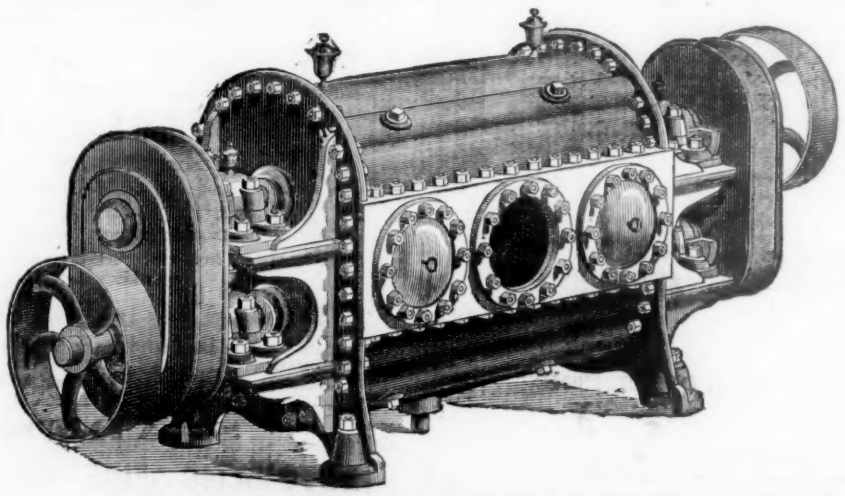

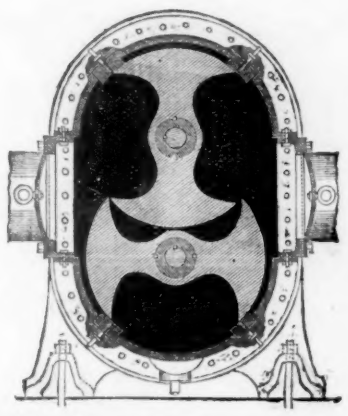

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THIRD.—Every part of the machine requiring care or attention, as the journals, gearing, etc., is external, easily observed and attended to. All changes, adjustments, and repairs are made from the outside. The journal bearings, if necessary, can be renewed in a few minutes.

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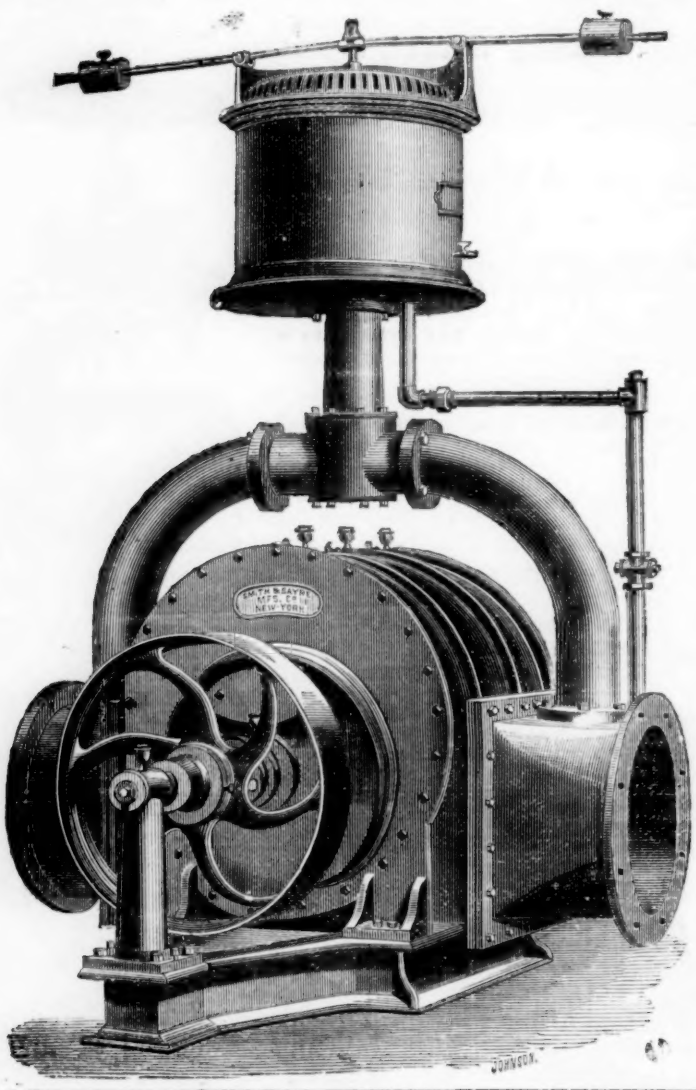
The Mackenzie Patent Gas Exhauster

And Patent Compensator.



They are made to pass from 4,000 to 150,000 cubic feet of gas per hour; will increase the production and illuminating power of the gas, and add very much to the durability of the retorts, either clay or iron. The Compensator obviates entirey the necessity of water-jo ints, is compact, durable, cleanly, not liable to get out of order, self-acting, quiet, and certain in its operation.

We are also sole proprietors and manufacturers of the

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The Blower is a Force Blast machine, durably built, and can be driven with one-third the power required to drive the ordinary fan.

The Cupolas are manufactured in sizes to melt from 1 to 90 tons per hour, will save one quarter of the time required by the old style Cupola and 33 per cent fuel. Address

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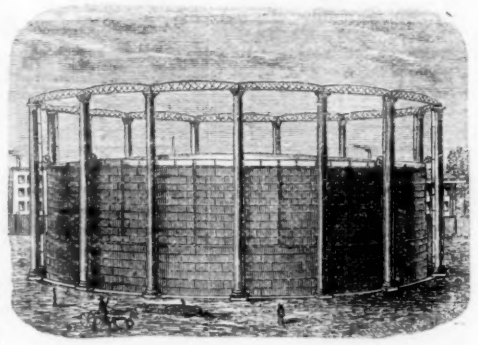

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Condensers, Scrubbers, Purifiers, Retorts, Hydraulic Mains and all other articles connected with the Manufacture and Distribution of Gas, furnished with despatch. Plans and Specifications prepared, and Proposals given for the necessary Plans for Lighting Cities, Towns, Mansions, and Manufactories.

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With cast iron guide and suspension frames. GAS ERNORS or REGULATORS, STREET MAINS, from 1½ 48 INCHES DIAMETER, for WATER or GAS. Street Main connections, such as BRANCHES, BENDS, DRIPS, SIEVES, etc.

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All the Smith and Sheet Iron work required in and abou Gas Works. 226-tf

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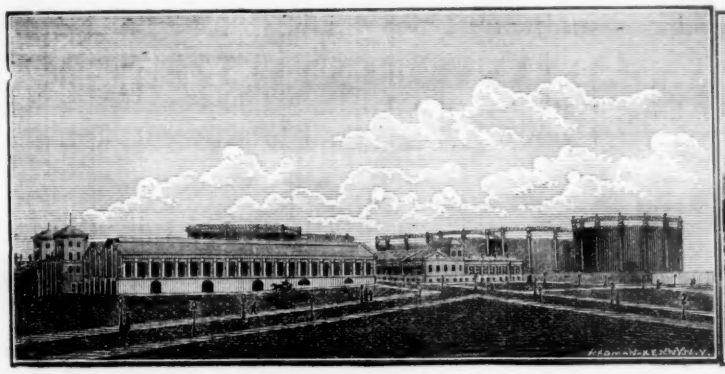

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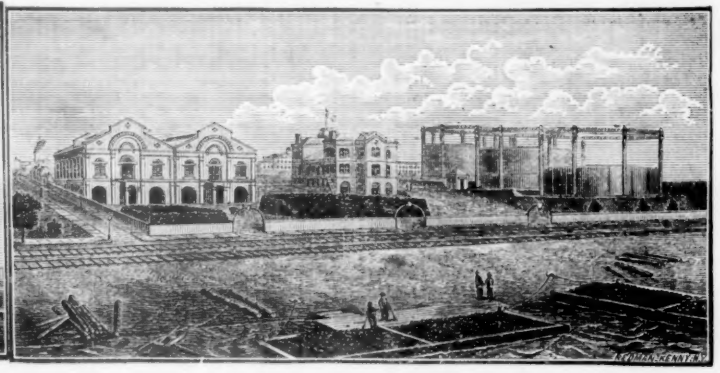

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Exhausters for Gas and Foul Lime Ventilation,
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Hydraulic Mains for Retort Benches,
Blowers for Forges, Foundries, &c.
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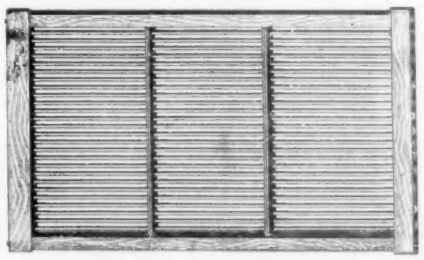

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This Screen is reversible, can be used either side up, gives a large purifying capacity; there is no clogging by foul lime, as the rattan presents a smooth surface and can be cleaned very easily. It is considered by all Gas Engineers who have used it to be the best Screen now in use.

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Boston, Mass.

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To Gas-Light Co's.

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Consulting or Constructing Engineer,

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He is prepared to furnish plans and Specifications, embracing all the latest improvements in the MANUFACTURE OF COAL GAS, at short notice, and on reasonable terms. His experience of THIRTY YEARS in the construction of Gas and Water Works, Railroads, Tunneling, etc., enables him to refer with confidence to any of the Works erected by him, as a guarantee of satisfaction and ability.

By arrangements with reliable manufacturers of all MATERIAL and SUPPLIES used by Gas Companies, he is prepared to furnish promptly all such orders, with best selections, and to give satisfaction as to prices, terms, etc., and respectfully solicits a share of patronage.

HENRY CARTWRIGHT, Gas Engineer,
2107 GREEN STREET, PHILADELPHIA. 379-6t

KIDD'S

Gas Consumers' Guide

Enables every Gas Consumer to ascertain at a glance, without any previous knowledge of the Gas Meter, the quantity and money value of the Gas consumed. Also the best method of obtaining from Gas the largest amount of its light.

It will be to the advantage of Gas Companies to supply their Consumers with one of these Guides, as a means of preventing complaints arising from their want of knowledge in regard to the registration of their meters. For sale by

A. M. CALLENDER & CO.,
42 Pine Street, New York, Room 18,

GAS COALS.

THE
PENN GAS COAL COMPANY

OFFER THEIR

COAL, CAREFULLY SCREENED,

AND PREPARED FOR

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Their Property is located in the Youghiogheny Coal Basin, near Irwin's and Penn Station, on the Pennsylvania Railroad, and on the Youghiogheny River.

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OF WEST VIRGINIA.

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CANNELTON CAKING COAL.

Volatile Matter.	Coke.	Per cent. of Ash in		Sulphur in			Specif. Gravity.	
		Coal.	Coke.	Coke.	Coal.	Volatile Matter.	Coal.	Gas.
35.1	64.9	2	6	.82	1.48	.66	1.289	.476

MAXIMUM YIELD, **5.06** cubic feet of Gas per pound of Coal—A yield of **4·78** cubic feet per lb.. —gave **16 14-100** Candle-Power.

COKE, of very fine quality—**1453** pounds produced from one ton of coal.

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H. W. BENEDICT & SON, New Haven.

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GAS COAL COMP'Y
Of West Virginia.

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(P. O. Box 432.)
BALTIMORE.

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A. Robinson, *Vice-President and Treasurer.*
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The result of use of this coal in *quantity* by several of the largest gas works in the country, is reported as follows, viz. Yield of gas, 10,000 to 10,500 feet per ton of 2,240 lbs.; illuminating power, 16½ to 17½ standard candles; coke, good in quantity and quality. 350-3m

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MINED IN TAYLOR COUNTY, WEST VA.

Company's Office, 52 S. Gay St., Baltimore.

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SHIPPING POINT—Baltimore, Md.

This coal yields 10,000 cubic feet of Gas, with an illuminating power of over 16 candles. Forty bushels of very superio Coke, with little Ash, and scarcely any clinker. 304-1y

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Orrel Coal Company,

Mines at Newburg, Preston County, W. Va.

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It yields 10,996 cubic feet of gas to the ton of 2,240 lbs. of good illuminating power, and of remarkable purity; one bushel of lime purifying 6,792 cubic feet, with a large amount of coke of good quality.

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The best dry coals shipped, and the promptest attention given to orders. 294-1y

THE DESPARD COAL COMPANY

OFFER THEIR SUPERIOR

DESPARD COAL

To Gas Light Companies throughout the country.

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Mines in Harrison County, West Virginia.
Wharves Locust Point, } Baltimore.
Company's Office, 29 South street, }

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NUMBERS 1 AND 2.

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355-

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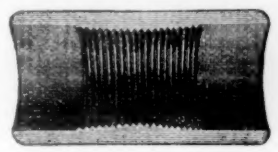

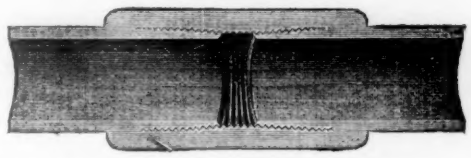

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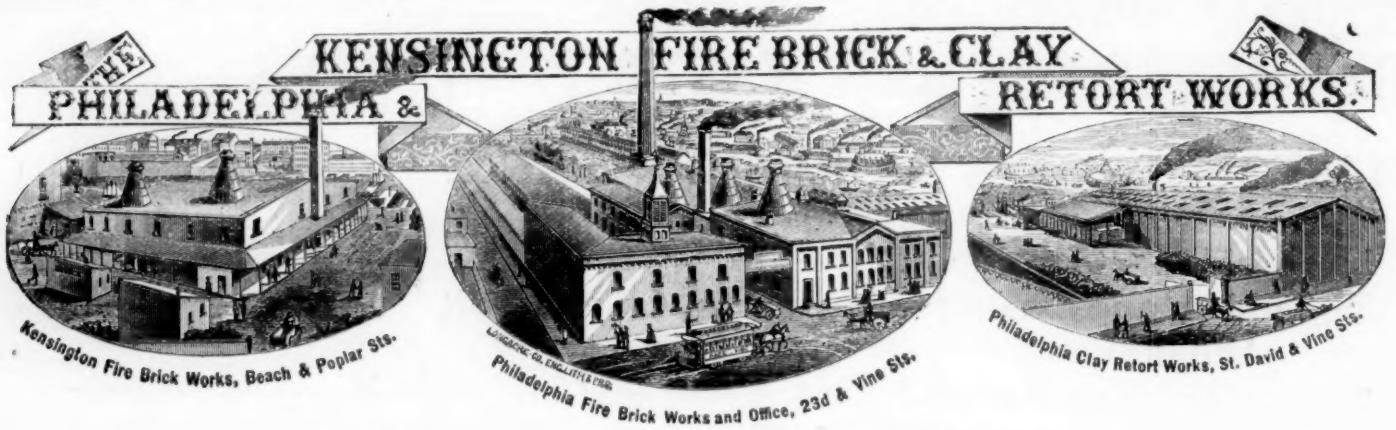
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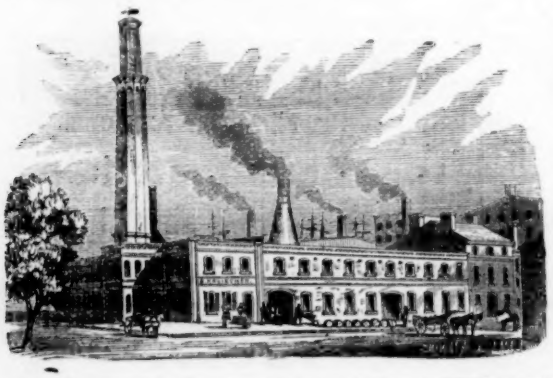

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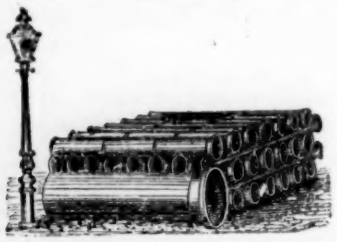

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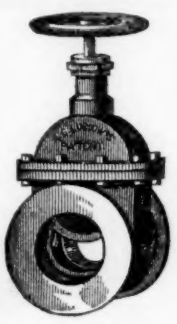

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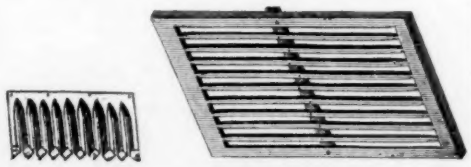

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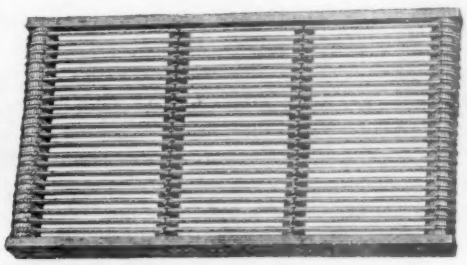

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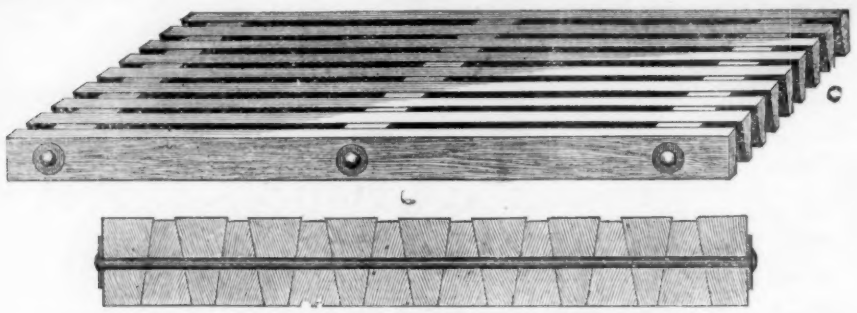

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